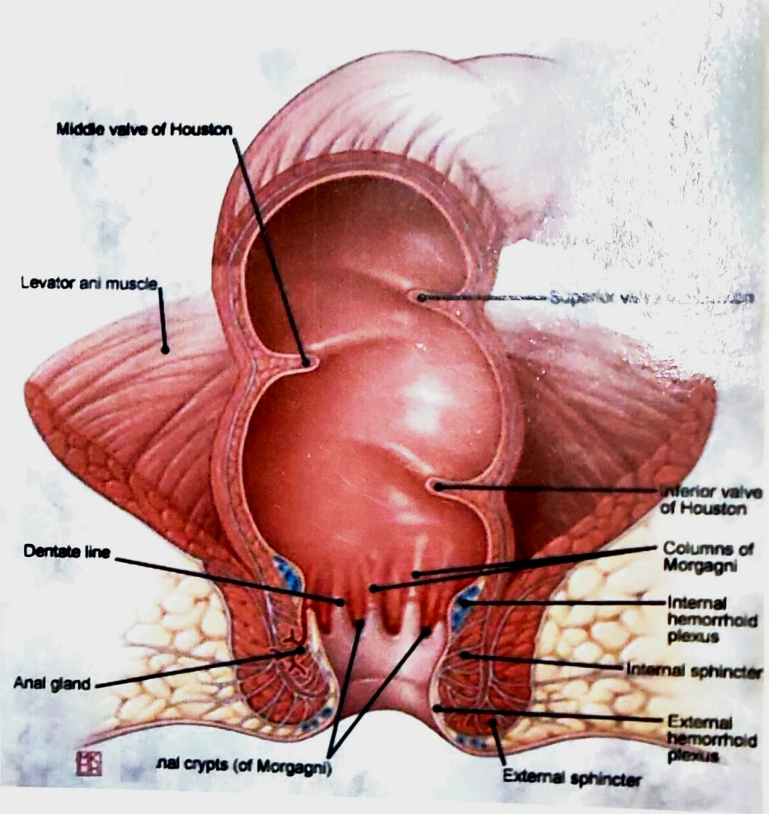
A manual of
Kshara Sautra Karma



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Edited by

Porf. (Dr.) Narinder Singh

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A manual of
Kshara Sautra Karma

By

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AYURVED SANSKRIT HINDI PUSTAK
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प्रकाशक
आयुर्वेद संस्कृत हिन्दी पुस्तक भण्डार
झालानियों का रास्ता, किशनपोल बाजार
जयपुर-302001 (राजस्थान), दुरभाष - 2312974
शाखा - दुकान नं. 372 के पास वाली गली, साई बाबा मन्दिर के सामने
चौडा रास्ता, जयपुर - 302003

© सर्वाधिकार सुरक्षित
आयुर्वेद संस्कृत हिन्दी पुस्तक भण्डार, जयपुर

ISBN - 978-93-92133-50-3

प्रथम संस्करण 2025

मूल्य - 695.00

प्रमुख वितरक
जे एस पी पब्लिशर्स एण्ड डिस्ट्रीब्यूटर्स
(Ayurvedic, Sanskrit & Astrology, Books Publishers)
(यूनिट - जगदीश संस्कृत पुस्तकालय)
भगवानदास मार्केट के सामने, तेलीपाडा
वाली गली के अन्दर, चौडा रास्ता, जयपुर (राजस्थान)
फोन नं.- 0141-2562577

लेजर टाईप सैटिंग: - सरस्वती कम्प्यूटर्स, जयपुर।

मुद्रक :- बालोटिया प्रिन्टर्स, जयपुर।

DEDICATED

TO

MY

STUDENTS

Foreword

Dear Dr. Ramesh Arya,
Professor Of Shalya Tantra,
Govt. Ayurvedic College Paprola,
Himachal Pradesh.

It has come to my notice that you have written a very useful boof "A MANUAL OF KSHARSUTRA KARMA". I am sure that this book will be helpful for Student & also for research works in the field of ANO-Rectal Diesas.

You have already done so muchy of work in Ayurvd & Modern Sugery Field & this book will be another feather in your cap.

My hartist congratulations & best wishes for your work.

Prof. Shyam Sunder Sharma
Ex. Professor Deptt. of Shalya Tantra
National Institute of Ayurveda Jaipur.

Ex. Principal
S.P.R. Ayurvedic College
Sikar (Rajasthan)

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Preface

The spectrum of ANUSHASTRA-KSHARAGANI KARMA is rapidly expanding with the introduction of advances in the diagnostic investigations and consequent therapeutic advancements. As a result thr is a rapid expansion of the contnts in Anushastra-Kshara karma therapeutics. Unfortunatelym no single book covers all the aspcts of Kshara-sootra karma. As a result, the students hav to go through several books including Samitas within shorft span of time. The book is the outcome of the author's experientce in Kshara Karma therapy for about thre decades asa teacher of both undergraduate and postgraduate students for whom this is primarily meant In this way, the book pretends to be a comprehensive book of Kshara Karma, as parasurgical measures to treat various surgical disorders and this volume would assit its readers in finding a perspectiv vision in Kshara sootra technique.

So the aim ofthis manual is to help the students in readily graping the solution of problems emerging at thetime if Kshara sootra application of manage the surgical disorder. As the practical approach has been offered, which makes the book most useful in the form of clinical aid to the students in cultivation of the art of the technique for the general surgeon as a constant guide in dealing with the Kshara Karma of treat Anal fistula, Sinus etc.

The outline of the book has been designed by myself nut, the finalhardwork pertaining to proff reading & typing etc. was done by my students to whom I am grateful, particularly Dr. Deepshikha.

I am greatly indebted to the colleagues of post graduate department of Shalya Shastra for their sincere help and constants co-operation in the publication of this book.

I express my thanks to Dr. Renu & Dr. Sunil kumar, M.S. (Shalya Tantra), D.A.V. Ayurveda college, Jalandhar, Punjab. for their continous help and encouragement inbringingout this book.

I admire the patience and the devotion of Sh. Dinsh Katoch Software engineer, who has helped me for typing and retyping the manuscript over and over agin, never with a grudge and always with a smile. My thanks are also due to the publisher for his co-operation.

With the best of my intention I have tried to avoid plagiarism ut this unavoidable rhetoric has got interwoven in the matrix of the content of text. So, In spite of the best efforts of the Auhtor and the Publishers there may be some mistakes in the text for which I owe an apology to my collegues and students.

Despite best efforts, some errors might have crept in. so constructive criticism and valuable suggestions for the improvement of the book will bw most welcome. I shall deem my labor amply rewarded in this book is appreciated by the readers.

Dr. Ramesh Arya

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Chapter - 1

Introduction of Kshara Karma

The description of kshara has been mentioined in detail in the *Brihat Samhitas* (i.e. Charak, Sushruta, Vagbhatta). Maharishi Sushruta has given the appropriate etymology of Kshara.

Etymological derivation of Kshara :-

The word kshara is derived from two root words

Ksarana and ksanana the word k. sara (Kshara) means to dislodge, to meltaway, to kill, to destroy the afflicted fissue.

The term ksharana implies to debridement,desloughing and liquifection of devitalised infected tissue present in the infected lesions.

The term kshanan implies to destruction/devitilazation of tissue.

Pharmacotherapeutic Properties of Kshara :-

The kshara described by Acharya sushruta is not an entiety made up of single constituent.Instead itis a formulation having many ingradients with specific characteristics that work upon particular *doshas* due to their particular *Ras, Guna, Virya, and Vipak.* Hence the kshara described by Acharya Sushruta is Tridosh-shamak as it pacifies all the three doshas.

Being white in colour it is placid in character. It is capable of carrying out chemical cauterization debridement, desloughing and liquifection of devitalised infected tissue hence making the local wound conditions favourable for wound healing.

Fundamental Properties of Kshara :-

Colour - White

Potency - Somya

Action as an External application :-

Shodhan	(cleansing)
Shoshan	(adsorbent)
Skandhan	(styptic)
Lekhana	(curette)
Ropan	(healing)

Action after Internal Use :-

Krimi-ghan	(wormifuse/helminthicide)
Ama dosa hara	
Kapha hara	
Kustha hara	
Vishagna	
Meda sam Upanta	

Detils concerning predominance of rasa & Anurasa in kshara :-

Sr. No.	Acharya	Rasa	Anurasa
1.	Charaka	Katu, Lavana	-
2.	Vagbhatta	Katu, Lavana	-
3.	Sushrutas	Katu	Lavana
4.	Dalhana	Lavana	Katu

Properties of kshara :-

Rasa	-	Katu
Veerya	-	Ushna
Varana	-	Shukla
Guna	-	Somya, tikshna, agneya
Doshagna	-	Tridoshagna
Karma	-	Dahana, pachana, darana, vilayana, shodhana, ropana, shoshana.

Kshara Guna :-

(i)	Neither too strong	(ii)	Neither too mild.
(iii)	White in colour	(iv)	Fine
(v)	Slimy	(vi)	Unspreading
(vii)	Soothing	(viii)	Quickly acting

The Kshara possessing the above mentioned qualities is said to be perfect for executing Kshara karma over various disease.

Kshara Dosha :-

(i)	Too mild	(ii)	Too white
(iii)	Too hot	(iv)	Too sharp
(v)	Too slimy	(vi)	Too spreading
(vii)	Too thick	(viii)	Incompletely processed
(ix)	Prepared from drugs of lesser potency.		

The Kshara possessing one or more of the above mentioned dosha will lead to complications following kshara karma .

The above mentioned characters are in particular specific to the Kshara desribed by acharya sushruta in sutra-Sthana. These can not be the truth for any other Kshara and in particularly to the Kshar popular in these days say Apamarga or any other varient.Main plant described by acharya sushruta concerning composition of khara is Mushkak that still remains a controversial ingradient. In current scenario majority of the kshara are being prepared using one or sometime more then one plant as main constituent and that too not as the method described by acharya sushruta . So it is not rational to say that every kshara is tridosh-shamak in nature. Doshaghnata mein be as per the particular charcter & properties of the ingradient used to prepare that particular Kshara. A lot of work is required to be done on many parameters to establish the properties of available kshara.

Classification of Kshara :-

(i) Pratisarniya (Kshara for external use)

(ii) Paniya (Kshara for internal use)

In **Ashtanga samgrahs,** Kshara has been classified into two categoies

(i) Bahiya parimarjan (ii) Antah parimarjan

Indications of Pratisarniya Kshara :-

(i) Skin disorders :-

Kustha (Dermatosis)	Kitibh (Hyperkeratosis)
Tilkalaka (Non elevated mole)	Dadru (Ring worm)
Nyachha (Hyper pigmentation)	Mandala (Cirular patches)
Kilasa (leucoderma)	Vyanga (Naevi)
Charmkila (Hypertrophy of papillae and epidermis)	
Mashak (elevated mole)	

(ii) Mukha roga :-

Upjivha	(cystic swelling)	Upkusha (gingivitis)
Adhjivha	(ranula/cystic swelling)	Dantavaidharbha (Gingivitis)
Trividha rohini (Diphtheria)		

(iii) Miscellaneous - (Surgical disorders)

Bhagandara (fistula in ano)	Nadi (sinus)
Dushtavrana (Indolent ulcer)	Arbuda (Bening neoplasm)
Krimi (larva of insect - flies, maggot infested wound)	
Bahiya vidhradhi (external abscess)	

Indications of Paniya Kshara:-

(i) Sharkara (Urinary gravel) (ii) Gulma (Abdominal swelling/lump)

(iii) Agnimandya(Anorexia) (iv) Ajeerna (Indigestion)

(v) Arochaka (Anorexia) (vi) Anaha (Abdominal distension)

(vii) Ashmari (Calculus) (viii) Krimi (Worms)

(ix) Visha (Poison) (x) Arsha (Haemorrhoids)

(xi) Prostatomegaly (asthila) (xii) Mutrakrichha (dysuria)

(xiii) Yakritpliha vridhi (hepato-spleno megaly)

(xiv) Udar roga (Abdominal disorder)

(xv) Abhyantra vidhradi (Internal abscess)

Contraindication for Internal use of Kshara :-

(i) **Rogi prakriti :-**

(a)	Durbala	(debilited person)
(b)	vridha	(old age)
(c)	Bhiru	(appreshensive)

(ii) **Roga (disease) :-**

(a)	Sarvangshoth	(anasarca, generalised oedema)
(b)	Prameha	(urinary disorder)
(c)	Rakta-pitta	(haemorrhagic disorder)
(d)	Kshat-sheen	(cachexic/chest problem)
(e)	Garbhini	(Pregnancy)
(f)	Trishna	(dehydration)
(g)	Ritumati	(mensturating subject)
(h)	Murchha	(syncope)
(i)	Pravridh jwari	(hyper pyrexia)
(j)	Klevya	(impotency)

(iii) **Kaal (Season)**

(a)	Sheeta	(winter)
(b)	Ushna	(summer)
(c)	Varsha	(rainy)
(d)	Dur-Dina	(Unauspicous day)
(e)	Pravata	(breezy

(iv) **Pradesh (Body parts) :-**

(a)	Marma	(vital organs or neurovascular structures)
(b)	Sira	(vascular regions)
(c)	Snayu	(ligament)
(d)	Sandhi	(joints)
(e)	Tarunasthi	(cartilagenous region)
(f)	Sevani	(tendons)
(g)	Dhamani	(artery)
(h)	Gala	(throat)
(i)	Nabhi	(umbilicus)
(j)	Nakha	(nail)
(k)	Srota	(channels)
(l)	Anta Shepha	(urethra)
(m)	Alpamansal pradesha	(Less musular areas)

Method of preparation of pratisarinya Kshara :-

It is of three types

(i) Mild (ii) Moderate (iii) Strong

Step I

Collection of Plants :-

Having done the customary rituals , various constituents as mentioned below must be collected in a way as described in sushruta samhita. The ingradient mushkak (A controversial plant which may be Sheberia sweatinoidea as per Acharya P V Sharma) is a main constituent of Kshara as per the description available in Sushruta samhita).

Step II

It is chopped into small pieces, heaped together in an appropriate place , ignited using sesame stalks (Sesamum indicum) after mixing with pebbles of lime stone. When the fire has burnt out, the ash and slake lime is collected separately.

Step III

Following the same method the whole plant (Panchang)including roots, stem, leaves, branches and fruits of the following plants are burnt for preparing pratisaraniya caustics *Kutaja (Holarrhena antidysentrica), Palasa (Butea monosperma), Asvakarna (Dipterocarpus turbinatus), Paribhadraka (Erythrina variegata), Bibhitaka Terminalia bellirica), Argvadha (Cassia fistula), Tilvaka (gynandropsis gynandora), Arka (Calotropis procera), Snuhi (Euphorbia nerifolia), Apamarga (Achyranthes aspera), Patala (Stereospermum Suaveolens), Naktmala (Pongamia pinnata), Vlsa (Adhatoda vasica), Kadali (Erythrina variegata), Citraka (Plumbago zeylanica), Putika (Karani) (Pongamia pinnata), Indravrksa(Wrighta tomentosa), Sphota (Hemidesmus indicus), Asvamaraka (Nerium indicum), Saptaccchada (Alstonia scholaris), Agnimantha (Premna mucronata) and Gunja (Abrus precatorius)* and all the four types of kosataki (Luffa acutangula) are burnt. Then one drona (12.228 kg) of the collected ash is dissolved in six dronas (73.368 liters) of water or cow urine as mentioned and is stirred well. The floating particulate materials consisting unburnt wood, charcoal or other such unwanted matters are skimmed off from the surface. The solution is stirred repeatedly for few times.

After this the solution is left undisturbed for overnight. The supernatent is colleted by performing decantation. The process of decantation is performed with due care for seperating the dissolved constituents from the undisolved constituents that have setteled in the bottom of the vessel after their settlement owing to their weight. The decented supernatent is filtered twenty one times through watmann fine grade filter papaer or with clean muslin cloth. The filtered supernatent is than heated on fire in a big pan while it is slowly stirred by aladle. When the solution becomes clean, red and slimy, it is re-filtered through a wide piece of muslin cloth and the filtrate is put again on the fire after removing the separated residue (if any). This prepared kshara is known as mild or Samvyuhima variety.

Step IV

Method of the preparation of moderate variety of Pratisaraniya kshara.

Eight pala (384 gram) of Shankh nabhi (Conch core) lime stone , Bhasmasarkara, Katsarkara, jal shukti) are mixed with remaining alkaline water i.e. two Drona and is further heated and stirred keeping constant vigilance. It is processed in a way that it neither becomes too sticky nor too thin. When it has been boiled appropriately it is taken down from the flame and is preserved in a wide iron pitcher with its lid covered.

Ingradients to be added to mridu kshara to make it madhyama kshara :-

Sr.	Sanskrit Name	Source
1.	Bhasma Sarkara ing	Secteted drops from plant edges during burn became solid form or burnt lime.
2.	Kata or Suddha Sarkara	Unburnt, Semi burnt pieces of limestone
3.	Sukti (oyster shell)	Oystrea edulis
4.	Shankh-nabhi	Calcite ($CaCO_3$)

Shuddha sarkara Kalika churna/burnt lime/ caustic lime or calcium oxide **:-**

It is an well understood alkaline mineral. it is found in the form of carbonate, sulphate, phosphate, silicate and flourate.

Sukti (Oystrea edulis)

It is commonly known as oyster shell, found in ocean. It contains calcium carbonate 85-90% phosphate and sulphate of calcium and magenesium oxide of iron, alumina and silica.

Shankh nabhi ($CaCO_3$) :-

It is well formed trigonal crystals very common as nodular compact and earthy. Calcite is infusiblebut becomes highly luminous when heated.

Calcite is the fo the most common and most widespread mineral on earth's surface where it is the only stable in form of $CaCO_3$. It is a principal constituent of sedimentary limestones rock an occurs in carbonate shells in fine precipitates and as clastic materials.

Ingradients to be added to madhyama kshara to constitute *teekshana Pratisaraniya kshara* :-

If the same is mixed with one Sukti (24 gm) of the fine powders of Danti (Baliospermum montanum), Dravanti (Croton tiglium), Citraka (Plumbagao zeylanica), Langli (Gloriosa superba), Putika (karanja) (Pongamina pinnata), Pravala Talaparti (Asparagus adscendens), Vida, Suvarcika, Kanakakshiri (Argemone mexicana), Hingu (Ferula narthex), Vacha (Acorus calamus) and Ativisa (Aconitum heterophylum) in equal proportions of as many of them as are available are mixed with kshara solution prepared as a moderate pratisarniya kshara. This is the process of pakya kshara, the strong variety of kshara.

Medicinal plants and minerals which is mixed to make Madhyama to Tikshan Kshara :-

Sr. No.	Sanskrit Name	Latin Name	Family
1.	Danti	Baliospermum montanum	Euphorbiaceae
2.	Dravanti	Crotan tiglium	Eurphobiaceae
3.	Chirtaka	Plumbago zeylanica	Plumbaginaceae
4.	Langli	Gloriosa superba	Liliaceae
5.	Hingu	Ferrula narthex	Apiaceae
6.	Vacha	Acorus calamus	Araceae
7.	Sukti	Myrtilus mrgariferns	Pearl (Oyster)
8.	Pravala	Corallium rubrum	Animal product
9.	Vida-lavasna	Navasadar	Mineral product
10.	Sauvarchala-lavana	Roack salt	Mineral product

11.	Talpatri	Asparagus adscendens	Liliaceae
12.	Kanakaskshirti	Argemone mexicana	Papaveracease
13.	Putika	Pongamia pinnata	Fabaceae

Application of Pratisarniya Kshara in case of lesions say internal piles :-

Preoperative arrangement (Poorva karma) :-

- Written and informeed consent of patient and attendant is obtained.

Firstly patient is made to go through snehan and swedan karma. Subsequently fatty, hot, and liquid diet in a small quantity is given to suppress the pain originating from vata vridhi and patient is kept in solitude sacred poorva karma room.

- Soap water enema is administered to clean the bowel .
- Tetanus prophylaxisis administered as per standard treatment protocol

Pradhan Karma :-

Position of patient :-

- Keeping in due consideration the weather conditions, the patient is made to lie on a procedure table in lithotomy position.

Digital Rectal Examination (DRE) :-

- This is the most important examination for valuable information pertaining to the specificity of lesion which must be executed before kshara karma on pile mass.

Proctoscopy :-

- A well lubricated proctoscope is gently introduced into the anal canal of tha patient for the appropriate visualisation of the lower 1/3 rd of rectum and the anal canal.

The interior of the anal canal in the region of the haemmorhoidal mass is gently cleaned wih the guaze piece preferrably soaked in normal saline.

2nd Step :-

Pratisarnya Kshara is applied with the help of spatula. 1st on pile mass located on right side located at 7 o'clock position. The Kshara is wiped out after counting hundred with lime juice. Similarly, the pile masses located on other primary positions are to be dealt with the application of Kshara.

If the colour of the haemmorhoidal mass mateches the colour of pakwa jamuna fruit or it appear to be suppressed or regressed in size then this implies that the kshara has done its work efficiently.

3rd Step :-

Neutralization of excess kshara is made if required by the application of kanji (amla), tila (Sesamum indicum), madhu etc. Then Ghrita mixed with Mulathi (Glycirrhiza glabra) powder is applied over the cauterized part of haemmorhoidal mass to minimise the burning sensation secondary to kshara applicatin.

Post Kshara karma therapy :-

- The patients is advised ushna avgahana and cold water is sprinkled over the head.
- The patient is advised to take liquid diet and directed to remain in a place free from extreme atmospheric conditions.

- Patients is advised to take following drugs

Shigru-guggul	-	2 Tab TDS
Rasanjanvati	-	2 Tab BD
Eranda bhrist haritaki	-	6-10 gm OD

Jatyadi ghritais advised for local application

Signs of appropriately executed Kshara karma :-

When the kshara has been properly applied the followin signs are there :

- Suppression of the disease
- Felling of lightness
- Cessation of discharge

Signs of in-appropriately executed Kshara karma :-

When the kshara application is inadequat the following features appear

- Pain
- Irritation
- Heavines
- Aggravation of the disease

When there is excessive application of the kshara the following features appear

Burning sensation	Inflammation
Red colouration	Discharge
Bodyache	Fatigue
Thirst	Fainting
Death (in extreme cases)	

Sub-sequent Sittings :-

The second sitting for the kshara application if required is preferably performed after inteval of minimal seven days or it may lenthen as per the status of local mucosa.

Importance of Kshara Karma :-

when applied properly, the haemmorhoids get cured definitely owing to its property of alleviating all the three doshas & a pottential agent causing efficient and conttrolled chemical cauterisation under aseptic conditions.

Chemistry of Kshara :-

Prof. A.R. Vasudev Murthy describes the chemical composition of kshara in his India Tradition of Chemistry and Chemical Technology as follows :-

The wood ashes contain potassium and sodium carbonates (K_2CO_3 and Na_2CO_3) lime stone and sea shells contain calcium carbonate ($CaCO_3$). On heating strongly carbonate decom poses into calcium oxide (CaO), quick lime and carbon dioxide (CO_2) which escapes into the air. Calcium oxide reacts with water vigorously and gives calcium hydroxide $Ca(OH)_2$. Which is limewate indeed. Calcium hydroxide reacts with potassium/sodium carbonate and gives rise to calcium carbonate which comes down as precipitate. Alkali hydroxide (KOH) remains in solution which may be concentrated by boiling for different extents. This essential chemical reaction can be expressed in terms of the follwoing equations.

1. $CaCO_3$ - $CaO + CO_2$
2. $CaO + H_2O$ - $Ca(OH)_2$
3. $K_2CO_3 + Ca(OH)_2$ - $2KOH + CaCO_3$

Standardization of kshara :-

The use of plants and herbs for medicinal purposes is as old as mankind. Out of all medicines 40% today contain one or more active components derived from plants. The 50 % of the medications given in Asia as therapeutic drugs are plants derived.

Standardization of the kshara is an absolute requirement of this era.Standardization of a drug doesnot include only analytical control but also requires thorough description of the ingredients. Thus, to ensure therapeutic efficacy of the drug it is necessary to have standardisation in terms of biological, chemical and physico- chemical parameters.The following factors are required to be considered while formulating the kshara in concern to the constituents :-

General protocolos for the standardization of raw material for palnt and plant based formulations include

- Authentication by detailed morphological, taxonomical studies.

Age and origin :-

- Stage of harvesting
- Method of drying
- Storage of crude drugs
- Organoleptic evaluation
- Microscopical examination including quantitative microscopy
- Volatile matter
- Ash value
- Extractive value
- Chromatographic profile
- Quantitative estimastion of a maker compounds (s) by various quantitative methods

Different mehtods used for the standardisation of herbal drugs are spectrophotometry, fluoimetry, polarography, titrimetry, gravimetry an chromatography. zthe chromatographic method includ TLC (Thin layer Chromatography), HPTLC (High performace thin layer Chromatography) Fingerprint profile, HPLC (High Performance layer chromatography), GLC (Gas liquid Chromatography).

Estimation of pH :-

Carbon dioxide free water (10ml) is added ot 0.1g of test material. The mixture is vortexed for 1 minute and set aside for 15 miutes. This is then vortexed again for 1 minute and centrifuged. The clear supernatenat is collected and its pH is measured using a digital pH meter .

Estimation of sodium and potassium Content :-

Sodium and potassium content are determined by flame photometry. Separate stock solution of sodium/ 'potassium (500 m Eq) is prepared using NaCl and KCl respectively in triple distilled water. Separate working standared solutions containing 0.5, 1.0, 2.0, 4.0, and 5.0 mEq of sodium/ potassium are prepared from respective standard stock solutions and flame photometer readings are recorded for these solutions choosing appropriate filters. Separate calibration lots fro sodiu,/Potassium are prepared 0.05g of Apamarga Kshara shaken gourously

with 15 ml triple distilled water in 50 gm volumetric flask and volume made upto mark. The solution is filtered and the filtrate is subjected to flame photometry choosing either sodium/potassium content in the test material is recorded.

''तत्र क्षरणात् क्षणनाद्वा क्षारः।''

(सु. सू. 11/4)

''नानौषधिसमवायात् त्रिदौषघ्नः शुक्लत्वात् सौम्यः तस्य सौम्यस्यापि सतो दहनपचनदारणादिशक्तिरविरूद्धा, स खल्वाग्नेयौषधिगुणभूयिष्ठत्वात् कटुक उष्णस्तीक्ष्णः पाचनो विलयनः शोधनो रोपणः शोषणः स्तम्भनो लेखनः कृम्यामकफकुष्ठविषमेदसामुपहन्ता पुंस्तत्वस्य चातिसेवितः।''

(सु. सू. 11/5)

''अम्लवर्जान्रसान् क्षारे सर्वानेव विभावयेत्। कटुकस्तत्र भूयिष्ठो लवणोऽनुरसस्तथा।''

(सु. सू. 11/18)

''नैवातितीक्ष्णो न मृदुः शुक्लः श्लक्ष्णोऽथ पिच्छिलः। अविष्यन्दी शिवः शीघ्रः क्षारो ह्यष्टगुणः स्मृतः।।''(सु. सू. 11/16)

''अतिमार्दवश्वेत्यौष्ण्यतैक्ष्ण्यपैच्छिल्यसर्पिताः। सान्द्रताऽपक्वता हीनद्रव्यता दोष उच्यते।।''

(सु. सू. 11/17)

''तत्र प्रतिसारणीयः कुष्ठकिटिभदद्रुमण्डलकिलासभगन्दरार्बुदार्शोदुष्टव्रणनाडीचर्मकीलतिलकाल-कन्यच्छव्यंगमशकबाह्यविद्रधिकृमिविषादिषूपदिश्यते। सप्तसु च मुखरोगेषूपजिह्वाऽधिजिह्वोपकुशदन्तवैदर्भेषु तिसृषु च रोहिणीषु, एतेष्वेवानुशस्त्रप्रणिधानमुक्तम्।''

(सु. सू. 11/7)

''पानीयस्तु गरगुल्मोदराग्निसंज्ञाजीर्णारोचकानाहशर्कराश्मय्यभ्यिन्तरविद्रधिकृमिविषार्शस्सूपयुज्यते।''

(सु. सू. 11/8)

''अहितस्तु रक्तपित्तज्वरितपित्तप्रकृति बालवृद्धदुर्बलभ्रममदमूर्च्छातिमिरपरीतेभ्योऽन्येभ्यश्चैवं-विधेभ्यः।''(सु. सू. 11/9)

''नादेयी कुटर्जाकशिग्रुबृहतीस्नुम्बिल्व भल्लातक व्याघ्रीकिंशुक पारिभद्रकजटाऽपामार्गनीपाग्निकान्।
वासामुष्ककपाटलाः सलवणा दग्ध्वा जले पाचितं हिंग्वादि प्रतिवापमेत दुदितं गुल्मोदराष्ठीलिषु।।''

(चक्रदत्त गु. चि. 30/48)

''सितातुल्यो यवक्षारः सर्वकृच्छ्रविनाशनः निदिग्धिकारसोवाऽपि सश्रोद्रः कृच्छ्रनाशनः।''

(चक्रदत्त मू. 32/26)

''पाटल्या यावशूकाश्च पारिभद्रात् तिलाछदपि क्षारोदकेन मदिरां त्वगेलोषणसंयुताम्।
पिबेद् गुडेन मिश्रान वा लिह्यादेतान् पृथक्-पृथक्।''

(चक्रदत्त मू. चि. 33/03)

''तथा मर्मसिरास्नायुसन्धितरूणास्थिसेवनीधमनीगलनाभिनखान्तः शेफः
स्रोतःस्वल्पमांसेषु च देशेष्वक्षणोश्च न दद्यादन्यत्र वर्त्मरोगात्।''

(सु. सू. 11/29)

''तत्र सम्यग्दग्धे विकारोपशमो लाघवमनास्रावश्च हीनदग्धे तोदकण्डुजाड्यानि व्याधिवृद्धिश्च।
अतिदग्धे दाहपाकरागस्त्रावाङ्गमर्दक्लमपिपासामूर्च्छाः स्युर्मरणं वा।''

(सु. सू. 11/26)

''क्षारदग्धव्रणं तु यथादोषं यथाव्याधि चोपक्रमेत्।।''

(सु. सू. 11/29)

''अथ नैते क्षारकृत्याः। तद्यथा
दुर्बलबालस्थविरभीरूसर्वाङ्गशूनोदारिरक्तपित्तिगर्भिण्यृतुमतीप्रवृद्ध ज्वरिप्रमेहिरूक्षक्षतक्षीणतृष्णामूर्च्छोपदत-क्स्नीवापवृत्तो-दतवृत्तफलयोनयः।''

(सु. सू. 11/28)

''तत्र क्षारसाध्यव्याधिव्याधितमुपवेश्य निवातातपे देशेऽसम्बाधेऽग्रोपहरणीयोक्तेन विधानेनोपसम्भृतसम्भारं, ततोऽस्य तमवकाशं निरीक्ष्यावघृष्यावलिख्य प्रच्छयित्वा शलाकया क्षारं प्रतिसारयेत् दत्त्वा वाक्शतमात्रमुपेक्षेत।।'' (सु. सू. 11/20)

''तस्मिन्निपतिते व्याधौ कृष्णता दग्धलक्षणम्। तत्राम्लवर्गः शमनः सर्पिर्मधुकसंयुतः।।'' (सु. सू. 11/21)

''अम्लकाञ्जिकबीजानि तिलान् मधुकमेव च।
प्रपेष्य समभागानि तनैनमनुलेपयेत्। तिलकल्कः समधुको घृताक्तो व्रणरोपणः।।'' (सु. सू. 11/23)

''तत्र सम्यग्दग्धे विकारोपशमो लाघवमनास्रावश्च। हीनदग्धे तोदकण्डुजाड्यानि व्याधिवृद्धिश्च।'' (सु. सू. 11/28)

□□□□

Chapter - 2

Introduction To Kshara Sootra

Kshara sootra is a well known and more acclaimed medicated surgical ligature used to manage the various surgical disorders especially in diseases occurring in ano-rectal region.

Historical background of Kshara Sootra :-

Kshara sootra karma is a minimal invasive parasurgical measure capable of performing excision or chedana; by virtue of its mechanical action and phytochemical cauterization. The word Kshara Sootra implies that Kshara as the main ingredient so, it is very fascinating to note that kshara must be present as one of the ingredients of Kshara sootra when it is being prepared for surgical use.

Acharya Sushruta has advised its use and method of application in Nadi vrana, Arbuda and Bhagandara. Although he has described tha preparation of Kshara in detail and application of Kshara Sootra in the management of Nadi Vrana. Acharya Charaka also indicated its aplication in Bhagandara in the chapter of so that treatment. But remained silent on its method of preparation.

Acharya Vagbhatta also followed Sushruta's method of application of Kshara sootra. So it is worthy to mention that applicationof Kshara Sootra has been well documented in Brihatrayee. Surprisingly, they remained silent regarding the process of preparation of Kshara sootra. So for as literature of Laghutrayee is concerned, only Bhavaprakash has mentioned the use and method of application of Kshara Sootra similar to that of Sushruta.

Thereafter in the text related of Ras aushadi chikitsa, there has been description of various types of Sootras (surgical ligatures) which have been medicated by using different drugs such as Snuhi, Haridr Jytosmati etc. But Kshara was never and ingredient of this preparation that is why literary, they cannotbe named as Kshara Sootara. But only in Ras Kamdhenu (17th Cen. A.D.), where the author describes the use of Kshara as one of the important ingredient in the preparation of medicated ligature.

Even author of Rastarangani (19th Cen. A.D.) has not mentioned the use of Kshara in the preparation of medicated ligature as he advocated use of medicated ligature.

Dr. Prof. P.j. Deshpandey et.al from Banaras Hindu University has worked in all respects of Kshara Sootra in a scientific manner. Futher, the work in this regard was carried out in various institutes of AYUSH all over the India and even in foreign countries like Japan. Moreover the different type of Kshara Sootra have been designed at various institutes for use in the application of various surgical problems namely haemorrhoids, fistula-in-ano etc.

In nutshell, Kshara Sootra was first quoted by Sushruta in the context of the nadivrana the sinus (500-1000 BC), in the chapter of Nadivarana. Then Vagbhatta (100 A.D.) described as a peeta sootra indicates it's color as yellow, attributed to the turmeric powder used in its preparation. Later Chakradutta in the 11th Century indicated th Kshar Sootra prepared from haridra and Snuhi ksheera. Then Sodharamalla in his work Gada Nigraha, Vidyachinatamani and Bhasavarajeeyam have also mentioned the Kshara Sootra in their respective writeups.

Research and Development on Different types of Kshara Sootra :-

1. **ICMR Studies :-**

Randomised, double blind and multicentric trial at PGI, AIIMS, JIPMER and Madras Medical College, validated the studies and proved superiority of Kshara sootra technique over the conventional surgery.

2. Standardisation of Kshara Sootra at mulit CSIR centres (CDRI and RRLO, Jammu).

3. BHU - Studies on different types of Kshara Sutra

Standard Apamarga Kshara Sootra	1968
Udumber Kshara Sootra	1984
Papaya Kshara Sootra	1984
Snuhi Kshara Sootra	1986
Yava Kshara Sootra	1990
Ghritakumari Kshara Sootra	1993
Tankan Kshara Sootra	1995
Argvadhadi Kshara Sootra	1996
Guggulu Kshara Sootra	1999

Following is the sequel events which indicate the stage wise development of the Kshara Sootra.

K.R. Sharma	1968	Standard Apamarga Kshara
I.V.P. Rao	1976	Recurrent rate
Arjun Tripathi	1976	Rectal Fistulae
B.S. Malhotra	1980	Multiple Fistulae
A.K. Singh	1983	Bacteriological Study
Dhanvantari	1984	High Anal Distula
M.K. Jalan	1984	Udumbara Kshara Sootra
O.P. Singh	1986	Papaya Kshara Sootra
A.K. Gupta	1986	Snuhi Swarasa Kshara Sootra
Subba Reddy	1990	Extract of Ghrita Kumari
Narsinghrao	1990	Snuhiksheera Extract
R.K. Singh	1990	Tankanshara
Demanth	1992	Comparative Study
ICMR	1992	Comparative Study
Dattatreya Rao	1998	Hisological & Histochemical Studies

Analytical and developmental studies of the Kshara Sootra :-

Gewali	1990	4 Tri terponoids euphol
		2 Di- Terponoids
		3 -Curcumonoids
CDRI Lucknow	1994	Physico Chemical Parameters (Hand et. al.)

In Japan, the Toyama Medical University, the study team of wakan yaku in the traditional Japanes medicaine department, have studies the analytical aspects of the Kshara Sootra and reported that it is having the following formulas.

- Eupho — Triterpene
- Curcumin — Diferuloylmethane

Ingredients :-

- Barbour's surgical linen thread 20 G
- Latex of Euphorbia nerifolia (snuhi ksheera)
- Apamarga kshara Achyranthes aspera
- Haridra Curcuma longa .

Rquipments :-

- Tensiometer
- Oven
- Silica bag
- Kshara Sootra cabinet
- Petry dish
- Glass tube
- Petromax blower flame
- pH meter
- Glass tubes
- Incubator
- Kshara Sootra hanger
- UV Light source
- Sterile gauge pieces

Thread :-

The principle in the selection of the linen thread for the preparation of Kshara Sootra is that it must not cause contact reaction & must be having good tensile strenght . The thread should have the capacity of retaining the coating impregnated over it. The surgical barbour's linen thread size 20 G has been found to be the apperopriate one afte tbservational studies & discussions. It has sufficient tensile strength and thickness and does not produce any local reaction when used. The other threads like silk, nylon etc were not of much use since they do not retain the coatings of the medicaments.

Latex :-

The idea behind th use of latex is that it is sticky in nature and forms a fine coating over the thread. Repeated coatings over the tread are made. This prevents the thread coming in direct contact with the kshara which by the alkaline nature may hamper the tensile strenght of the thread. Total 11 coatings of the latex aremade over the tread,one after another after proper drying of the previous coating.

Collection of Haridra Powder :-

A fine powder of the dried rhizome of curcuma longa is collected to make Kshar Sootra. Alternatively, the rhizome of Curcuma longa is purchased from the market and washed in water and dried. The rhizome of the dried curcuma longa are broken in pieces and with the help of electric mixer, its fine powder is prepared. Thereafter, it is filtered in muslin fine cloth to make ready for the use in preparation of kshara sootra.

The powder of haridra is used in the last three coating of kshara sootra as antiseptic and anti histaminic substance and also prevents the direct contact of Kshara sootra with the atmospheric air that can lessen the potency of Kshara sootra. Since the kahara is excessively hygroscopic which catches the moisture and affect its potency. Therefore, by the coating of haridra powder, it can be preserved and used for a longer period.

The ready made powder of Haridra from the market has been found containing various dirt and irritating substances and its use in preparing the Kshara Sootra make it unsuitable and painful to the patients.

Collection of Snuhi Ksheer :-

The latex of snuhi used for the preparation of kshar sootra must be collected fresh maximally 1-2 hours prior for usage. The latex cannot be preserved or stored for a long time. After one hours of its collection, the latex starts separating into a watery portion and solid gelatinous or resinous portion. The watery portion is of no use. But the solid portion of the left over part of latex can be stored for a day or two in refrigerator in a tight container. This can be used in future by dissolving it in chloroform just before use. But for regular coatings, the fresh latex should be used each time. The best season for the collection of the latex is from the month of October to April. The collection of the latex must be done in clean laboratory glassware and must be corked immediately. It must be collected preferably in the morning hours. The stem of the plant is stabbed with a sharp knife of stainless steel at a suitable site and the latex is collected drop-by-drop in a glass container.

Apamarg Kshara :-

Kshara is a product prepared by burning the whole plant selected to form kshara and mixing the ash in water and keeping it overnight, after filteration, the water is heated to get a fine white coloured powder. The studies using different kshara have been conducted and achyranthes aspera is found to have accceptable qualities with regards to the preparation of the thread and management of the disease afore said.

Equipments :-

Thermaostatic Kshara Sootra cabinet with U.V. light :-

This is especially designed for preparation of Kshara Sootra. The latest horizontal Kshara Sootra cabinet is adopted by the various departments but few prefers vertical Kshara Sootra cabinets. It has two compartments, side by side, meant to put the Kshara sootra hangers in proper way. It is completely closed cabinet,maintains temperature of about 40 degree Centigrade constantly. It is also having the ultraviolet light tube for sterilizatio of Kshara Sootra.

Kshara Sootra Cabinet :-

(i) Bigger chamber (ii) Smaller chamber

The bigger chamber is meant for keeping the Kshara Sootra hangers while smaller chambers containing hot air blowers, fan etc. A thermometer is also fitted which indicates the temperature inside the cabinet.

The Kshara Sootra cabinet can accommodate as many as 30-50 hangers. Thus, the capactity of a cabinate to manufacture Kshara Sootra is one batch is 900-1500.

Hangers :-

The Kshara Soota hangers are the rectangular shaped structures, made up of thick aluminium/wooden strip of about 2 cm in widht and 4 cm in thickness. It contains 2 short arms and 2 long arms.

Each hanger has small cuts (notches) on the both sides which ar placed at a distance of 2-3 cm from each other. These notchs are meant for hooking barbour's linen thread size 20 though out the width and length of the hanger.

There may be variation in the size of the hanger depending on the size of the cabinet. The width ofhanger is about 30 cm and each hanger has 15-20 notches on either size. In this way, one hanger an accommodate as many as 30-40 linen threads at a time and Kshara Sootra cabinate can accommodate as many as 30-50 hangers

Advantages :-

- To prevent the atmospheric dust particles from sticking over the wet threads.
- It dries the coated threads rapidly.
- To avoid contamination.
- To maintain sterilization through U.V. light.

- It acts as a bactericidal through constant temperature.
- By constant heat and dryness it prevents the hydrophilic activity of the coated medicated Kshara Sootra.

Petry Dish:-

It must be autoclaved and is used for storage of Apamarga Kshara, Snuhi Ksheer and Haridara during their application over the thread. The petry dish is cleaned and autoclaved after each application.

Glass Tubes :-

These are used for packing of the prepared Kshara sootras. The glass tubes are autoclaved prior to the packinig of prepared kshara-sootra. The sterile Kshara sootra from the hanger are picked by using gloved hands and are kept inside sterile galss tubes with just one fold of the kshara sootra. Glass tubes are then sealed with the help of petromex blower.

Technique of Preparation :-

Surgical linen thread size 20 G is tied to one end of the hanger and hooked to all the notches till the other end of the hanger is reached where it is tied snugly once again.

The treads are then smeared in snuihi latex with the help of a clan gauze. All the four sides of the thread, viz. Front, back, above and below, are uniformly smeared. The hanger is then palaced in the cabinet. The cabinet is closed properly and threads are allowed to dry with the help of two 200 watts bulbs and/or hot air blower. The same process is repeated eleven times. After each coating U-V exposure is given to the threads for 20-30 minutes daily.

The twelth coating is done by first smearing thread with snuhi latex an then passing the wet linen thread through a heap of finely powdered Apasrmarga Kshara. When all the threads are smeared with Kshara the hanger is gently shaken so that the excess Kshara particles fell down. The hanger is now again placed in the cabinet for drying and for U-V light exposrue. This process is repeated till seven coating of Snuhi and Apamarga Kshara are achieved.

The remaining three coatings are finally completed with Snuhi and fine powder of turmeric. Snuhi latex is applied gently and uniformly over the threads and then the wet threads are passed through a heap of fine turmeric powder. Afte encah coating the threads are dried in the cabinet and given U-V light exposure for 30 minutes.

Thus, twenty one coatings over the threads are completed. The order fo coatings can be summarized as follows :-

1.	Snuhi latex	=	11
2.	Snuhi latex + Apamarga kshara (alternately)	=	7 each
3.	Snuhi latex + Haridra powde (alternately)	=	3 each
	Total coatings		**21**

Measurement of Thickness of Thread After Coating :-

Thereafter the prepared Kshara Sootras are checked for their thickness with the help of micrometer Screw Gauge. The threads should have more or less uniform thickness, varying between 2.10 with maximum variation of 0.11 mm.

Packing of Kshara Sootra :-

After this, each thread measuring 11-12 inches is cut away at the two ends overlying the wooden/Aluminium strip and the threads are packed and sealed in oven dried sterile glasss tubes. Packed threads are once again given the U-V light exposure for 30 minutes.

Only one fold of Kshara Sootra is enouth. Many folds must be avoided lest the coating may be stripped off from the prepared Kshara Sootra. The Kshara Sootra is then kept in a polythene bag of appropriate size which is then gently sealed. This is again put inside of good quality of glass tube which should again be sealed on a petromax blower falme. The process of sealing is very delicate and so it must be carried out wih utmost care, lest the glass tube might crack or a whole of galss tube may remain unsealed. It is better to put a small silica bag inside the tube before sealing so that whatever moisture is left inside the tube, will be absorbed by the silica. The sealed tubes containing Kshara Sootra must again be kept inside the cabinate for the exposure of ultra violet raiation. Thereafter, the sterilized Kshara Sootra tubes are stored in a separate cabinet or incubator and has to be broken only at the time of its use in a procedure room.

Method of labelling :-

Follwing details must be mentioned on the label put on each glass tube :-

1. Name
2. Date of manufacturing
3. pH
4. Batch Number

pH of different drugs in apamarga Kshara Sootra :-

Sr. No.	Drugs	pH
1.	Snuhi	5.6
2.	Apamarga	10.2
3.	Haridra	6.2

Mechanism of Action of Kshara Sootra :-

The Kshara Sootra act as medicated encircling ligatur impregnated with latex, kshara and haridra coated over surgical linen of size 20G . it is a very novel medicinal article (medicated setone) planned in a very scientific manner to have effective delivery of the constituents in controlled manner.

- Surgical Linen - Causes cutting by mechanical preseure over tissue due to occlusion of the perfusing blood vessels & subsequent necrosis.
- Latex of Snuhi (Euphorbia) - Being Proteolytic in character promotes proteolysis hence desloughing.
- Apamarag kshara being alkaline in nature promotes desloughing of un-healthy granulation tissue.
- Haridra Powder - An established antiseptic promotes wound healing.

Chemical compostion in medicated thread known as kshara sootra :-

Apamarga (Achyranthes aspera) Achiruanthin KCL Steroids (B-sitosterol)	Snuhi (Euphorbia antiquorum) Latex	Haridra (Curcuma domestica) Powder
(Sligmaserol-glucosides) Inokosteron Ecydysteron Alkaloids	Euphol Triterpene euyphorbol Cycloartenol Cycloartenol Antiquol A & O Diterpene	Curcumin Turmerone Dilhydroturmerone Zingibern Phellandrene Cincol, starch

Pentosan, Potassium, oxalate		
ASH K_2CO_3	Chemical Irritant	Antibacterial Antifungal
KCL Achyranthin KOH Steroids Caustic action Lysis of tissue	Smotth cutting	Antiinflammatory Antioxidant Anticoagulatory Antihepatotoxic

Indications of Kshara Sootra :-

- Fistula in ano
- Haemorrhoids
- Chronic fissure in ano with fissure abscess.
- Pilonidal sinus
- Benign neoplastic pedunculated swelling.
- Chronic sinuses
- Corn
- Rectal polyps and papillomas
- Warts

Contradications of Kshara sootra :-

(a) **Definite contraindication :-**

- Specific variety of Osteomyelitis
- Tuberculosis
- Intra-abdominal cold abscess
- Chronic/acute cold abscess
- Regionla ileitis
- Pelvic abscess
- Intestinal and pelvic malignancies
- Veneral disease
- Strictures of urethra causing urethral sinuses
- Crohn's disease

(b) **Associated condition :-**

These are the fistulsae where Kshara sootra can be applied but the treatment for the systemic conditions should also be instituted. Thses are :-

- Tuberculosis
- Diabetes Mellitus
- Hypertension

- Ischaemic Heart Disease
- Neuropathic conditions e.g. paraplegia etc.
- Chronic amoebiasis
- Benign prostatic hypertrophy
- Anaemia
- Uraemia and C.R.F.
- Urinary Tract Infections.

Advantages of Kshara Sootra therapy :-

- Simple, safe and sure treatment.
- Kshsara sootra application is the method for chemical fistulectomy rather than surgical fistulectomy.
- It is simple & minimally invasive surgical technique.
- Requires minimal armamantarium for clinical usage.

Requires Minimal assistence of anesthesia :-

- Requires Minimal hospitalization.
- Kshara sootra can be used in patients who are otherwise not fit for surgery e.g. diabetic cardiac patients, hypertensives.
- Cost effective - low cost procedue.

Standardization of Kshara Sootra :-

Introduction :-

Kshara sootra has been used for many centuries & the product has already been fully standardized previously.But the standardization done previously requires a review to in-corporate noval ideas as per the current scenario. Standardization of kshara sootra is complicated as it is a device which contain inorganic as well as organic cnstituents.

The individual ingredients of Kshara Sootra :-

1. Fressh latex collected from Euphorbia nerifolia.
2. A fine powder of the dried rhizomes of curcuma long (haridra powder)
3. Kshara prepared from the plant Achyranthes aspera.
4. Surgical linean thread diameter 0.521 mm, length about 31 c.m with the variation of 1.5 cm, tensile strength 6 and 7 kg measured by pully and weight method.

Analytical investigation :-

1. **Analysis of curcuma longa powder :-** The following points are taken for the study :

The haridra powder (turmeric) should comply I.P. 66 specifications for microscopical description, identification, organic matter, ash, alcohol soluble extractive.

Curcumin content 200 mg of the alcoholic soluble extract is dissolved in ethanol (10ml). 20 ul of this solution is loaded over one part of the TLC plate (E. Merck Silica gel 20 x 20 cm F254, thickness 0.25 mm divided into three equal parts). The other part of the plate is loaded with 50 mg of standard curcumin leaving the thired part as blank. The plate is developed in chloroform "methanol 49:1 and visulaized under U.V. The corresponding zones containing curcumin and blank are marked, scoped out and extracted with methanol (3x5ml). The methanolic solution is concentrated and made 10 ml with methanol in each case and O.D. recorded against the blank at 418 nm. The content of curcumin in the powder is then claculated by the following formula :

% content of curcumin powder =

$$\frac{\text{OD of test solution}}{\text{OD of standard solution}} \times \frac{25 \times \text{percentage of total alcoholic extract}}{\text{Wt. of alcoholic extract used for the estimation (in mg)}}$$

Where OD is opic density.

The results are reported in table 1.

2. Analysis of the batches of Euphorbia nerifolia latex.

(a) **Description** :- Fresh latex is a milky white sticky liquid which coagulates on keeping.

(b) **Solubility** :- Partially soluble in alcohol, chloroform, ethyl acetate, ethanol and sparingly soluble in water.

(c) **Loss on drying** :- Latex was taken up for loss on drying determiniation and it varied from 63 to 83 per cent when dried to constant weight at 105 degree centigrade.

(d) **Estimation of triterpene marker in the latex** :- 20 mg of the latex is dissolved in chloroform and loaded over one part of the TLC plate (E. Merck silica gel 20 x 20 cm F254, thicknesss 0.25 mm, divided into three equal zones). The other part of the plate is loaded with 210 ug of the standard triterpene marker (the major constituents of CHC13 soluble extractive of latex) leaving the thired part blank. The plate is developedd in choloroform : hexane 3 : 2 dried and visulalized in iodine. The triterpene marker zones and blank are marked, iodine evaporated of f on a water bath. The marked zones are scooped out, extracted with chloroform "methanol (1:1) mixture and concentrated under reduced pressure to dryness in each case. The dried mass from test solution is diluted with choloroform to 25 ml and one ml of this is taken and concentrated under reduced presure to get test solution concentrate. Acctic anhydride (4ml) is added in the dried mass obtained as above from the standard solution and test solution concentrate, cooled below 10 degree Centigrade in ice and 1 ml of concentrated H2SO4 is added drop wise keeping the temperature below 10 degree centigrade. A pink colour is first obtained which immediately changes to a light brown colur. After 5 minutes the slutions are brought to room temperature and left for further 20 minutes, the OD of each solution is measured at 276 nm and content of triterpene marker in the sample is calculated. THe results are reported in table II.

3. **Analaysis of kshara formrd from Achyarnthes aspera :-**

(a) **Description** :- White hygroscopic powder.

(b) **Solubility** :- Soluble in water (1g dissolved in 5 ml of water forms a clear solution)

(c) **Identification** :-

(i) Gives effervescence with dilutre mineral acid.

(ii) Gives flame test for potassium ion.

(iii) Gives tests for SO4 and CL ions.

(d) **Loss on drying** :-

The batches of Kshara are taken up for loss on drying determination and it is fournd to vary form 0.8 to 10.0% when dried to constant weight at 105 degree centigrade.

(e) **Estmation of Alkalinity of Kshara** :-

Kshara (100 mg) is disssolved in distillaed water (5 ml). Methyl red indicator (2 drops) is added inthe solution and it is then titrated with N/25 HCl. The results are given in Table III.

4. **Analysis of Kshara Sootra :-**

In four batches (5 sample each) the following points ae taken up for the further study

(a) **Description :-** Reddish brown coated thread.

(b) **Lenght :-** 31 + 1.5 cm tensile strength 4.5 kg.

(c) **Wt/cm :-** Varies from 20 mg to 40 mg.

(d) **Los of drying :-** Diffferent batches of Kshara Sootra are thaken up for loss on drying determination and it varied from 2.3 to 14.0% (w/w) when dried to constant weight at 105 degree centigrade.

(e) **Ash :-** Ash is determined in the 5 batches as per mehtod prescribed in Indian Pharmacopoeia 1966, appendix XXI, p 650. It is found to be between 46-58% w/w.

(f) **pH :-** The pH of 1% aqueous extract of Kshara Sootra varied from 9-9.3

(g) **Alkalinity (N/25 HCl consumed) :-** 5 cm long thread is triturated with 5 ml of water. Methyl red indicator (2 drops) is added and the solurions is titrated with N/25 HCl. The results are given in Table IV.

(h) **Estimation of Curcumin in the Kshar Sootra :-** Kshasr Sootra (5 cm length) was weighed and treated iwht 0.2 ml concentration hydrochloric acid. After 10 minutes the mixture is extracted with acetone (3x5 ml). The acetone layer is separated and concentrated under vaccum. THe method is repeated as described under the heading curcumin contenct. The Content of curcumin in the Kshara Sootra is then calculated by the following formula :

% content of curcumin in Kshara Sootra =

$$\frac{\text{OD of test solution}}{\text{OD of standard solution}} \times \frac{0.005}{\text{Wt. of 5 cm long Kshara Sootra (g)}}$$

(i) Estimation of triterpene (marker) in the Kshar Sootra - Kshara Sootra (5 cm lenght) is weighted and extracted with hot mixture of chloroform : methanol, 3:2 (4x5 ml). The orgainc layer is separated and carefully concentrated to dryness, redissolved in CHCl3 CH3Oh mixture (0.5to 1 ml) and the method is repeted as descibed under the heading estimation of triterpence marker in the latex (by loading 700 mcg of standared triterpne marker and diluting the extractive of standasrd and test solution zones to 10ml). The percentage of triterpene maker is calculated in Kshara Sootra.

The result with batch variation of the Kshar Sootra are given in Table IV.

Table I

Analysis report of Haridra used in different batches of Kshara Sootra :-

Batch No.	Identification (behaviour with acid and alkali IP)	Ash (%w/w)	Hexane soluble extractive (% w/w)	Total alcohol soluble extractive (% w/w)	Curcumin content (% w/w)
A	Positive	7.3	1.08	5.94	1.00
B	Positive	7.6	1.31	6.23	1.44
C	Positive	9.46	1.44	6.5	1.82
D	Positive	7.90	2.26	9.96	3.92

Table II

Analysis report of Latex used in different batches of Kshara Sootra :-

Batch No.	Solubility	Loss of drying at 105 degree centigrade	Triterpene (Market) (% w/w) content on dried basis (% w/w)
(a)	Partially solube in alcohol Chloroform and sparingly soluble in water	77.5	16.53
(b)	Partially soluble in alcohol chloroform and sparingly soluble in water	63.64	10.13
(c)	Partially soluble in alcohol, chloroform and sparingly soluble in water	69.04	10.41
(d)	Partially soluble in alcohol, chloroform and sparingly soluble in water	82.8	5.37

Table III

Analysis report of Kshara used in different batches of Kshara Sutra :-

Batch No.	Description	Solubility	Loss on drying at 105 degree centigrade % (w/w)	Identification	Alkalinity N/25 HCL Consumed by 100 mg of Kshara (ml)
(a)	White, hygroscopic Powder	Highly soluble in water, 1g dissolve in 5 ml of water,	9.57	Gives efferves-cence with dil. mineral acid Gives tests for Na+ & K+	23.45
(b)	Do	Do	7.4	Do	22.05
(c)	Do	Do	Negiligible	Do	23.28
(d)	Do	Do	0.82	Do	25.72

Table IV

Analysis of Kshara Sootra :-

Batch No.	Sl. No.	Color	Lenght (Cm)	Wt/cm (gm)	Tensile strength	Loss on drying at 1050C (%w/w)	Ash % (w/w)	pH	N/25 HCl (ml constumed by 5cm Kshara Sootra	% curcumin in the sutra	% w/w/ of triterpens in the Kshara Sootra
(a)	1	Redd-ish brown	31.0	0.023	4.5kg	5.8	50.32	9.0	14.5	0.0073	0.332
	2	Do	31.5	0.029	-	3.8	53.67	9.0	18.38	3.0043	0.598
	3	Do	32.5	0.026	-	13.9	47.91	9.1	14.75	0.0097	0.678
	4	Do	32.0	0.020	-	9.1	54.53	9.2	12.0	0.0094	0.690
	5	Do	31.5	0.035	-	8.4	52.59	9.0	25.5	0.0086	0.844
(b)	1	Do	31.5	0.027	-	11.7	50.2	9.3	7.29	0.004	1.209
	2	Do	32.0	0.033	-	7.1	54.5	9.3	11.02	0.014	0.727
	3	Do	31.0	0.028	-	6.8	57.9	9.1	15.54	0.014	0.316
	4	Do	31.0	0.27	-	6.5	56.8	9.0	14.06	0.014	0.390
	5	Do	32.5	0.022	-	6.6	53.4	9.3	9.29	0.012	0.422
(c)	1	Do	31.5	0.035	-	4.7	50.3	9.0	21.88	0.001	0.408
	2	Do	31.0	0.027	-	8.3	46.5	9.0	26.88	0.0017	0.484
	3	Do	31.5	0.026	-	8.2	46.2	9.2	23.5	0.005	0.227
	4	Do	32.0	0.031	-	7.9	48.2	9.0	9.98	0.002	0.192
	5	Do	32.0	0.030	-	2.3	51.5	9.0	20.75	0.0028	0.362
(d)	1	Do	30.5	0.031	-	8.2	57.8	9.2	15.54	0.009	1.29
	2	Do	30.3	0.040	-	3.7	55.7	9.2	20.8	0.013	1.22
	3	Do	30.3	3.029	-	3.3	56.6	9.2	29.35	0.021	1.21
	4	Do	30.5	0.040	-	6.8	56.4	9.2	21.7	0.004	1.04
	5	Do	30.3	0.037	-	3.13	53.2	9.2	30.64	0.035	1.20

Based on the analysis of samples of Kshara Sootr the following specifications are suggested in nutshell :-

Thread	-	Cotton thread, diameter 0.5 mm with tensile strenght 6.7 kg
Colour	-	Reddish brown
Lenght	-	30 cm with variation of 1 cm
Wt/cm	-	0.035 g + 0.005 g
Ash	-	56% + 2%
pH	-	9.2
N/25 HCL consumed by 5 cm long thread	-	25 + 2.5 ml
% curcumin	-	0.02% + 0.005%
% latex	-	1.2% + 0.2%

Different forms of Kshara Sootra :-

Guggulu bassed Apamarga Haridra Kshara Sootra :-

After the extensive research work, guggulu based apamarga haridra kshara sootra has been developed.

Ingredients :-

Barbour linen thread size 20G

- Guggulu niryas (Commiphora mukul, Burseraceae)
- Apamarga kshara (Achyranthus aspera, Amaranthaceae)
- Haridra Churna (Curcuma longa, Zingiberacease)

Order of coating :-

1.	Guggulu solution	11
2.	Guggulu solution and Kshara	7 each
3.	Guggulu solution and haridra	3 each
	Total coating	**21**

Mehtod of preparation :-

1. Saturated solution of purified guggulu resinwith absolute alcoho as a solvent is used instead of the latex from Euphorbia nerifolia.
2. A barbour's linen thread size 20 G is taken and initial 11 coatings of guggulu solutions are done in a even manner.
3. Next seven coatings are done with guggulu solution and apamarga kshara powder as described earlier.
4. There after last 3 coatingis done with guggulu solution and hardira chruna.
5. This kshara sootra is kept in cabinet for U-V rays exposure for sterlization as per standard protocol.

Kutaj Kshara Sootra :-

Acharya Sushruta has described the use of Kutaja as one of the ingredients in preparation of kshara Ingrdeients-

- Barbour's linen thread size 20G
- Snuhi ksheer (latex) (Euphorbia nerifollia, Euphorbiaceae)
- Kutaja kshar (Holarrhena antidysenterica, Apocynaceae)
- Haridra powder (Curcuma longa, Zingiberaceae)

Coatings :-

1.	Snuhi ksheer	11 coating
2.	Snuhi ksheer & Kutaja kshara	7 coating
3.	Sunhi ksheer and Haridra powder	3 coating
	Total	21

Prepaation If kutaja kshara :-

1. The kutaja (panchang) is kept with small pieces of lime stones fire along with dried stems of tila (Sesamum indicum).
2. After complete burning of this panchang , ash is collected and limestone particles are separated.
3. The next step follows with addition of clean water in proportions of 1 : 6 volume of ash and wate respectively stirred vigerously many a time. Then the mixture is lreft undisturbed for 24 hours. The nearly clear supernatent is collected in a separate vessel through the process of decentation.
4. The collected decented solution is then filtered 21 times through muslin cloth to special coated vessel.
5. This mixture is then kept over mild fire for 24 to 48 hours.
6. When the mixture becomes clean and clear, it indicates stage of mridu kshara preparation.
7. After complete evapoation of water, dried white substance is collected, weighed and powdered into fine powder and stored in air tight dry container.

Method of Kshara Sootra preparation :-

1. A barbour's linen thread size 20G is initially coated with snuhi ksheera for 11 times
2. Then with snuhi ksheer and kutaja kshara next seven coatings are done.
3. Last three coatings are done with snuhi ksheera and haridra churna.

Teekshna Kshara Bhavita Sootra :-

Teekshna kshara sootra is made up of Apamarga ksharodaka and barbour's surgical linen size 20G.

Ingredients :- Apamarga (Achyranthes aspera), Palasha (Butea monosperma), Kutaja (Holarrhen antidysentrica), Paribhadra (Erytherina varigta), Vibhitaka (Terminalia bellirica), Vasa (Adhatoda vasica), Chitraka (Plumbago zeylancia), Gunja (Abrus precatorius), Danti (Baliospermum montanum), Dravanti (Croton tiglium), Langali (Gloriosa Superba), Pravala, Bida lavan Sauvarchalla lavan, Hngu (Ferrula narthex), Vacha (Acorus Calamus), Sukti (Oystrea edulis).

Method :-

1. Dried panchanga of apamarga plant is burnt with lime stone and other prakshep dravya like palasha, kutaja etc.
2. Collected ashes are mixed with water in 1:6 ratio of ash with water.
3. It is filtered through a cloth for 21 times in a big vessel.
4. Filtrate then poured in the percolator which is covered with whatman's filter paper allowed it for filtration.
5. This filtrate is taken separately in a big vessel and kept on mandagani (fire) , continuously stirred gently.
6. Powder made from sodhita hingu, pravala, sukti, lavanas and othe ingredients are mixed in sloution while stirring.

7. After 6-8 hours of this process a thick solution is obtained which is teekshna kshara.
8. Dipping method is applied for the preparation of skhara sootra and total 9 times of the surgica barbour's linen thread is dipped into the teekshna kshara and made dry spontaneously.
9. Then cutting of the thread in 30 cm of lenght is done and kept in Kshara Sootra cabinet for steriliza tion and drying.

Palasha Kshara Sootra :-

Acharya Sushruta, father of surgery has mentoned palasha as one of ingredients of Kshara in the context o preparation of pratisarniya kshara. It has property like krimighna, vranahara, guda rogajith.

Ingredients :-

1. Palasha kshara - Butea monosperma, family - Fabaceae
2. Snuhi ksheera - Euphorbia nerifolia, family - Euphorbiaceae
3. Haridra - Curcuma longa, Family - Zingiberanceae

Preparation of palasha kshara sootra :-

Snuhi	11 coatings
Snuhi and palash kshara	7 coatings
Snuhi and Haridra	3 coatings
Total coatings	21

Method :-

1. A barbour's linen thread size 20G is taken. Initially 11 coating of latex of snuhi are done in an eve manner.
2. Next 7 coatings of palash kshara and snuhi were done. Due to snuhi ksheera particles bind firml over surgical linen therad.
3. Final three coating were achieved with snuhi and haridra powder. The outermost coatings of t haridra prevents direct contact of kshara particles with atmospheric air.

After each coating U-V exposure is given to the Kshara sootra of 20-30 minutes in the kshara soot cabinet.

Arka - Haridar Kshara Sootra :-

Acharya Sushruta has described use of Arka as one of the ingredients in the preparation of kshara.

Ingredients :-

Barbour's linen thread size 20 G		
Arka ksheer	(Calatropis procera)	Asclepideaceae
Arka kshara	(Calatropis procera)	Asclepideaceae
Haridra churna	(Curcuma longa)	Zingiberaceae

Coatings :-

Arka Ksheera - 11 coatings
Arka Ksheera and arka kshara - 7 coatings
Arka Ksheera and Haridra - 3 coatings

Method :-

1. Initial 11 coatings of arka ksheera are dobe on surgical linen thread. Each coating is to be done after drying up the previous coating then keep it in U-V rays for 20-30 minutes.
2. Now 12th coatings of arka ksheera and arka kshara is done and similarly 6 more coating are done. In between after every coating of arka ksheera and kshara U-V rays exposure is given.
3. Last 3 coating of arka ksheera and haridra are done.

So by this mehtod total 21 days are required for complete formation of Arka haridr kshara sootra.

Japanese Kshara Sootra (Kanazawa sutra) :-

By	K. Tazawa
	K. Amamota

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Ingredients :-

1. Red pepper tincture (Capsicum)
2. Latex of fig (ficus carica)
3. Kshasra prepared from whole plant of Achyranthus gidenttata (family Anaranthaceae.
4. Turmeric powder
5. Suture material - 0.4 mm thickness and 0.0018 gm/cm

Procedure :-

1. Suture were stretched over a wooden frame (45 cm x 32 cm)
2. Spray of 10% red peper tincture solution using a sprayer.
3. Then careful coating with fig latex individually.
4. Then adhered with kshara and dried indoor. Then sutures were coated with red peeper tincture and fig latex in same cmanner.
5. Then turmeric powder was also used and suture were dried.
6. This coatings process was conducted once or twice.

Total number of cases treated :-

- 1101 of anal fistula
- 23 cases of anal fistula associated with crohn's disease

Results :-

- Fistulae tract tied by this kshara sootra was cut through during 1-5 weeks on an average
- Average lenght of cutting of tract was about 11-15 mm per week.

Follow up study :-

All the cases were examined every month for the first 3 months and every 3rd month there after.

Clinical result :-

Out of 1101 cases 5.4% - 60/1101 fistulae were subctaneous and submucous.

76.3% - 840/1101 - fistulae were intersphincteric

17.3% - 191/1101 - transphincteric or high level

0.9% - 10/1101 - extra sphincteric

After over 1 year of follow up :-

94.6% cases	-	1041/1101	-	complete cure
5.4% cases	-	60/1101	-	Recurrence

Complications observed (In 244 cases) :-

- 60 cases reported pus pocket formation
- 20 cases reported conversion to high level fistula
- 16 cases reported with mild deformity of anal canal.
- 12 cases reported delayed cutting.
- 7 cases reported bleeding.
- 6 cases reported anal incontinecnce.

Rasakamdhenu Kshara Sootra

In Rasakamdhenu Preparation of the kshara sootra has been descibed in 48th chapter of "Arsharognidan Chikitsadhyay"

Preparation of Kshara Sootra :-

Predparation of the kshara sootra is done in following manner

1. The Barbour's linen surgicla thread size 20G is first smeared with Snuhi ksheer & Arka ksheer, after that it is passed through shodhita bhallataka phalachurna (3 coating is done in following manner)
2. Jyotishmatin, Cara (Haritaki, Amalaki, Vibhitak), Danti, Koshataki, Agni (Chitrak), Saindhav lavan churna is mixe properly with ghrit. Then these whole mixture is used for coating over threaad (3 coating)
3. After smeraring thread with Snuhi ksheer & Arka ksheer thread is passed through mixture of Sauvarchal, Saindhav lavan & Haridra churna (3 coating)
4. After smearing thread with Snuhi ksheer & Arka ksheer thread is passed through Yava kshara. (3 coating)
5. In the last phase, snuhi ksheer & Arka ksheer is smeared over thread, then thread is passed through haridra churna to avoid directg contact of kshear with atmospheric ari (1 coating)
6. Thread is allowed to dry in Ksharsootra cabinet after each coating and UV light exposure is given after each coatings.

S. No.	Drug Name	Botanical Name	Family	Part
1.	Snuhi	Euphorbia nerifolia Linn.	Euphorbiaceae	Ksheer
2.	Arka	Calotropis procera Ait.	Asclepiadaneae	Ksheer
3.	Bhallataka	Semecarpus anacardium Linn.	Anacardiaceae	Phalachurna
4.	Jyotishmati	Celastrus panniculatus Willd.	Celastraceae	Beej
5.	Haritaki	Terminalia chebula Retz.	Combretaceae	Phala
6.	Amalaki	Euphorbia officinalis Gaertn	Euphorbiaceae	Phala
7.	Vibhitak	Terminalia bellirica Roxb.	Combretaceae	Phala

8.	Danti Mula	Baliospermum Montanum	Euphorbiaceae	Mula
9.	Koshataki	Luffa Acutangula Linn.	Plumbaginaceae	Mula
10.	Chitrak	**Plumbago** zeylanica Linn.	Plumbaginaceae	Mula
11.	Haridra	**Curcuma longa Linn.**	Zingiberaceae	Churna
12.	Yava (Kshar)	Hordeum **vulgare** Linn.	**Gramini**	Panchang

S.No.	Drug	Chemical Name
1.	Saindhav lavan	Chloride of sodium
2.	Suraj (Sauvarchal)	Potassium nitrate
3.	Ghrit (Goghrit)	-

Total no. of coatings :-

1. Snuhi ksheer + Arka ksheer + shodita bhallataka phalachurna - 3 coating
2. Jyotishmati, Vara (Haritaki, Amalaki, Vibhitak), Danti Koshataki, Agni (Chitrak), Sandav lavan churna + ghrit - 3 coating
3. Snuhi khseer + Arka ksheer + Sauvarchal, Saindhav lavan & Haridra churna - 3 coating
4. Snuhi ksheer + Arka ksheer + yava kshar - 3 coating
5. Snuhi ksheer + Arka ksheer + haridra churna - 1 coating

Total no. of Coating - 13 coating

भावितं रजनीचूर्ण स्नुहीक्षीरैः पुनः पुनः। बन्धनात्सुदृढं सूत्रं छिनत्त्यर्शो भगन्दरम्।। (भा. प्र. खंड 2/5/144)

सुधादुग्धं वातहरं गुल्मोदरविनाशनम्। विषाध्मानहरं चैव गुदांकुरहरं परम्।। (रसतरंगिणी 744/519)

अर्कस्नुहीतिलाश्वत्थचिंचापामार्गवह्निजम्। विलिप्य समधा ह्येव शोषयेद् भिषजां वरः।। (र. त. 745/528)

गृहीत्वा भस्म तस्मानुवस्त्रपूतं जलं हरेत्। (रसकामधेनु 354)

प्रलिप्तं सुदृढ़म सूत्रं छायायामथ शोषयेत्।। अशस्त्रकृत्यामेषिण्या भित्त्वाऽन्ते सम्यगेषिताम्।।

क्षारपीतेन सूत्रेण बहुशो दारयेद्गतिम्।। (अ. हृ. उ. 30/35)

भावितं रजनीचूर्णैः स्नुहीक्षीरे पुनः पुनः। बन्धनात् सुदृढं सूत्रं भिनत्त्यर्शो भगन्दरम्।। (चक्रदत्त अर्श चिकित्सा 5/148)

किम्यस्थिसूक्ष्मक्षणनव्यवायप्रवाहणान्युत्कटकाश्वपृष्ठैः।

गुदस्य पार्श्वे पिडका भृष्णार्तिः पक्वाप्रभिन्नातु भगन्दरः स्यात्।। (च. चि. 12/96)

एषण्या गतिमन्विष्य क्षारसूत्रानुसारिणीम्। सूचीं निदध्याद्गात्यन्ते तथोन्नम्याशु निर्हरेत्।। (सु. चि. 17/30)

सूत्रस्यान्तं समानीय गाढं बन्धं समाचरेत्। ततः क्षारबलं वीक्ष्य सूत्रमन्यत् प्रवेशयेत्।।

क्षाराक्तं मतिमान् वैद्यो यावन्नच्छिद्यते गतिः। भगन्दरेऽप्येऽप्येषः विधिः कार्यो वैद्येन जानता।।(सु. चि. 17/31-32)

स्नुह्यर्कनिग्रते क्षीरे भल्लातकसमन्वितैः। ज्योतिष्मतीवरादन्तीकोशातक्यग्निसैन्धवैः।। 126।।

चूर्णैरेतैः सघृतैर्गुण्ड्येत्सूरजोलवणानि हरिद्रया। अर्कस्नुहीपयोलिप्तं पुनः सूत्रं विशोषयेत्।। 127।।

त्रीन्वारां शोषयित्वा तु क्षारेणैव प्रलेपयेत्। एतेन बद्धान्यशांसि पतन्त्यैव न संशयः।। 128।।(रसकामधेनु 48/126-128)

अथेतरस्त्रिविधो मृदुर्मध्यस्तीक्ष्णश्च। तं चिकीर्शुः शरदि गिरिसानुजं शुचिरूपोश्य प्रशस्तेऽहनि प्रशस्तदेशाजातमनुपहतं मध्यमवयसं महान्तमसितमुष्ककमधिवास्यापरेद्युः पाटयित्वा खण्डशः प्रकल्प्यावपाटय निर्वातेदेशे निचितिं कृत्वा सुधाशर्कराश्च प्रक्षिप्य तिलनालैरादीपयेत। अथोपशान्तेऽग्नौ तद्भस्म पृथग् गृहीयाद्भस्माशर्कराश्च।। (सु. सू. 11/11)

मुष्ककपलाशधवचित्रकमदनवृक्षकशिंशपावज्रवृक्षात्रिफलाचेति।। (सु. सू. 38/20)

❑❑❑❑

Chapter - 3

Anatomy of Guda

Guda :-

The word guda is used by Acharyas to denote and organ that performs the actual function of defecation. Acharya Sushruta has given detailed description of embryological development of guda with blood supply, musculature and also functioning of guda.

Vyutpatti (Egymological Derivation of Guda) :-

The word guda is derived from verbal root 'guda kridayam' to express or to function or from the root Gupurisotsarg which expresses defecation. (Amarkosha - II).

Word of masculine gender.

"Godate' measns to play. 'guda' word at times is used for both i.e. end part of digestive system and end part of urogenital system. Thus the chief site of apana vayu is guda.

Synonyms :-

Amarkosha	-	Apanam, Payu
Jatadharam	-	Guhyam, Gudavartma
Vijayarakshita	-	Bradhanam
Gangadhara	-	Bradhanam
Vachaspati	-	Vitmarga

Embryological aspect of guda :-

According to Sushruta shasrira sthana, Antra, basti and guda of the foetus are formed from the cream part of rakta an kapha after being disgested by pitta along with acive participation of vayu.

It is matrija avayava and produced in the 3rd and 4th month o IU Life.

Anatomy :-

Acharya Charaka has mentioned 2 parts of Guda

(i) Uttarguda - Where faeces is stored

(ii) Adhara guda - Lower part by which faeces is defecated.

Size - 41/2 angula

Internal structure of guda :-

Sushruta has descirbed that the interior tof the guda (anorectal canal) contains three valis. They are pravahini, visarjini and samvarani. These are situated one above the other at an interval of 1 1/2 angulas. They are arranged in spiral form (sankavarta nibha) likened to involuted indentures in conch shell and resemble the colour of palate of an elephant (gaja talu).

Guda Valis :-

Sr.No.	Guda Valis	Situation	Co relation
1.	Pravahini	Proximal	Region near to Houston's valve
2.	Visarjini	Middle	Region near of ARR
3.	Samvasrani	Distal	Region distal to Dentate line

Vagbhatta has clarified the positions of these valis. He named proximal one is pravahini, the middle one is visarjini and distal one is samvarani. The outer most part Gudosta (anal margin) is situated at an anguli distence from hairy margin (romanta pradesha) and one angula away or distal to samvarani. Visarjini situated 11/2 angula above the samvarani and pravahini located 11/2 angula interior to visarjini.

Gudostha :-

The measurement starting from the hairy line to gudostha (anal lip) is one and half yava and last vali extends up to the one finger above gudostha but valies are counted from within outwards.

In the light of present day knowledge, some scholars translate vali as sphinecter (G.D. Singhal et al 1972). But Ganantha Sen considered as distal two Houston valves are pravashini and Visarjani respectively and area of external and internal sphincte collectively known as samvarani. Some authors consider lower Houston valve. Columns of morgagni and dentate line are pravahini, visarjini, samvarani, respectively. On the basis of measurement given in classics, distal vali (samvarani) is 2 cm from anal verge, which is the area of ano-rectalring, external sphincer, anal cushion and terminal part of internal sphincter. This area of samvarani consists of external and internal sphincter which maintains the contents. 11/2 anguli above this lies visarjini. The total lenght from anal verge to visasrjini is 21/2 anguli e.e. 5cm. Inferior rectal valve corresponds to this level,. The inferior rectal wall is considered as visarjini. This area is devoid of peritoneum and internal mucosal membrance rick in stretch senstive nerve endings. When the peritoneum an internal mucosal membrane rick in stretch sensitive process of defecation. 11/2 anguli above the visarjini is the site of pravashini (to scompress) so it lies 9 cm proximal ot anal verge. It is site of middely rectal valve. Valis are functions and structural and valis are seats of arsheas. If the arshas are considered to be orginating from vali as arshas are fleshy sprouts in anorectal region, include polyps, papillaem, neoplasia etc. occurring in other two proximal valis.

Siras :-

According ot Acharya Sushruta in koshta region there are 34 vayu carrying siras out of which 8 siras are situated in shroni region connected with linga and guda.

Dhamani :-

There are 24 dhamani in the body, out of which 10 go downwards an performs the functions of micturation, defecatin, ejaculation of semen, menstruation and expulsion of foetus during delivery.

Snayu :-

There are 60 snayu in pelvic region, Snayu which are connected with guda region are of sushira type.

Relation :-

It indicates that guda is located closely posterior to the vasti. In the context of anatomy of vasti, Sushruta says that vasti is having closer relation with guda and both are situated in "Gudhasti vivara'" (Pelvic cavity). It gives an idea that guda is situated in pelvic cavity with relation to vasti (Urinary bladder).

Bladder, prostate, scrotum and anus are inter related, present in pelvic vaity (gudasthi vivara). Sushruta descibed that Garbashaya is interfaced between bladder and large intestine. In tentra shareera, themuladhara Chakra is descibed to be situated between genitalia and anus. Generally muladhara chakra is co-related with that of

pelvic plexus of autonomic nervous system. Out of seven susrutokta kala, pureeshadhara kala is related to guda. Guda is described as moola of pureeshavaha srotas. It is related to annavaha srotass. It is the direct continuation of distal part of Adhoamashjaya. Futher it is described that it is attached to the large intestine. Sushruta and vagbhatta have mentioned that lenght of the guda is 4 1/2 angulas. The measurement of one angula is approximately 2cm. On the basis of theis the total lentght of the guda is 9 cm. It is well known that maximum lenght of the anla canal is 3cm. Thus the extent of guda is anal canal plus the lower 6 cm of rectum which gives roughly as inferior Houston's valve.

The total lenght of ano rectal canal from the anal margin to the recto sigmoid junction is about 16.5 cm out of this 3 cm is the lentht of the anal canal. Upper 7 1/2 cm in rectum was included in the large intestine by Sushruta. This 41/2 angulas measurements of guda exeeds the anal canal and fall short of recto sigmoid junction. It infers that guda includes anal canal adn a part of rectum.

Importance of guda :-

(i) Marma :-

Guda is mamsa marma while Vagbhatta include it in Dhamni marma. Similarly Acharya Sushruta has considered guda as udara marma, while Vagbhatta has included it in kostha marma.

Both Acharya consider it as sadhyapranahara, Injury to it caus obstruction of apana vayu (flatus), mala (faeces) and loss of movement in sthulantra (paralytic ileus) and patient dies instantaneously.

(ii) Pranayatana :-

Guda is considered as pranayatan owing to its anatomical & physiological importance.

(iii) Srotas :-

Guda is Bhirmukha ssrotasa. Acharya Charaka and Acharya Sushruta has put sthula guda as the root of the purishavaha srotasa.

(iv) Karmendriya :-

Guda is categorized under karmendriya group. Funcion designated to it is defecations.

Physiological concept of Guda :-

Guda is described as one of the panch karmndriyas and its function is to exrete the mala from the body. He also regards the guda and pakwashaya are the seats of apanavayu. The apanavayu helps in expulsion of vata, mutra, purisha, shukra and gardbha. In cae, this vayu is vitiated in the diseases of vassti and guda sasid to oocur. Vitiated apana vata is responsible for causation of diseases like arshas etc.

According to Gananath Sen, the proximal vali i.e. pravahini helps in compressions and pushing the stool downwards, visarjini, the second vasli relaxes during this process and allows stool to pass further down. The distal most vali, samvarani, which expels the stool out and constricts immediately, so that the continuuity of the cutout and falls dwon. Thus all these three valis and apana vayu are solely responsible for the mechanism of defecation.

Goligher and hughes (1951) conducted an experiment and concluded that section of sacreal plexus result in complete losss of reflexes for defecation and micturation. In contrast of section of spinal cord at higher level failed to produce that effect, hence apana vayu an be taken as sacral plexus. As already discussed guda does the function of both storing the excreta (uttara guda) and disposing the excreta (adhara guda). Three valis present in it are playing fey role in this mechanism. Pravahani compresses and pushes down the stool as spiral movement of houston vaslve, visarjini initiates defecatiion and samavarani does the function of closing the passage of faeces and flatus. In ayurveda basti karma is advocated as a chief treatment for pacification of vata as lower segment of rectum in absorptive in nature.

Antomy of Anal Canal

Dual embryogenic origin of anal canal :-

The anal canal is derived embnryonically form two sources. The region above the anal valves arises from the endodermally lined cloaca, whilst below this boundary it comes from the proctodeum, covered with ectoderm.

The cloacal part (above) is innervated by autonomic nerves : the arterial supply is mainly from the superior and middle rectal arteries, while the venous drainage is to the superior rectal vein, a tributary (via the inferior mesenteric vein) of the portal venous system. The lymphatics drain with those of the rectum.

The proctodeal part (below) is covered mainly by skin, and is hence innervated by spinal nerves and its vasculature is also that of the body wall, namely the inferior rectal artery and vein branches and tributaries of respecively, internal pudendal artery and vein. Likewise, the lymphatic drainage of this region forms that of peri-anal skin and passes to superficial inguinal lymph nodes.

The anal canal is the terminal portion of the intestinal tract, it begins at the ano rectal junction, is 3-4 cms' in length and terminates at the anal verge. The anatomical anal canal extends from the anal verge to dentate line. But thensurgical anal canal extend from the anal verge to the anorectal ring. It passes downwards and backwards from the perineal flexure. It has greatest surgical importance both becasue of its role in the mechanism of rectal continence and is prone to certain diseases.

In the normal living subject the anal canal is completely collapsed owing to the tonic contraction of the anal sphincters and the anal orifice is represented by an anteroposterior slit in the anal skin.

Relations of the anal Canal :-

Table

	Anterior	Posterior	Lateral
Both Genders	Perineal body	Anococcygeal ligament	Ischiorectal fossa
Male	Membranous urethra Bulb of peins	Tip of Coccyx	-do-
Female	Lower 1/2 of Vagina	-do-	-do-

Interior of the Anal Canal :-

This can be divided into 3 parts

(a) Upper Part :-

It extends from ano- rectal ring to the pectinate line and about 15 mm long, it is lined by columnar epithelium of endodermal origin. The mucous membrane shows anal columns of morgagni, anal valves, anal sinuses, anal papillae and pectinate line. Anal glands are 4-8 in number and each has a direct opening into apex of anal crypt and occasionally two glands open into same crypt.

(b) Middle Part :-

It lies between the pectinate line above and white line fo hilton below and about 15 mm long. This part of anal canal is lined by stratified squamous epithelium, Which is thin pale and glossy and is devoid of seweat glands. The Hilton's white line is situated at the level of interval between the subcutaneous part of anal sphincter and the lower border of internal anal sphincter. On digital examination in living subject an intersphincteric groove can be felt at this site.

(c) Lower Part :-

It is about 8 mm long and is lined by true skin containing the sweat and sebaceous glands.

Musculature of the Anala Canal :-

(a) **Anal Sphincters :-**

(i) **Internal Sphincter :-**

It is formed by the thickened (5-8 mm) circular muscle coat and is involuntary in nature. It lies above the subcutaneous part and deep to the superficical and deep parts of the external sphincter and ends below at the white line of hilton.

(ii) **External Sphincter :-**

It is made up of striated muscle and is under voluntary control. It surrounds the whole lenght of anal canal and consists of three parts.

(a) **Subcutaneous Part** - Which encircles the lower end of the anal canal and has no bony attachments.

(b) **Superficial Part** - Which is attached to the coccyx behind and the perianal body in front.

(c) **Deep Part** - Which surrounds the upper part of internal sphincter and is fused with the puborectalis.

(b) **Ano-rectal Ring :-**

The term was coined by 'Milligan and Morgan' to denote the functionally important ring of muscle which surrounds the junction of recum and anal canal. This is composed of the upper borders of the internal and external sphincters, which completely encircles the junction and on the posterior and lateral aspect, by the strong puborectalis sling. As a consequence, the ring is stronger posteriorly and laterally than anteriorly and its definition on the posterior aspect is accentuated by the forward angulation of the bowel at this level.

Recognition of the anorectal ring is of paramount importance in the treatment of abscesses and fistula in the anal region, its complete division inevitably results in recal incontinence, while its preservation, despite the sacrifice of all the rest of the sphincter muscular at least ensures that there will be no fross lack of control, though monor defress of incontinence may result.

Anatomy of Rectum

The rectum is about 5 inches (13 cm) long and begins in fornt of the third sacral vertaebra as a continuation of the sigmoid colon. It follwos the curvature of sacrum and coccyx and ends 1 inch (2.5 cm) in front of the tip of the coccyxx by piercing the pelvic diaphragm and becoming continuous with the anal canal. The lower partof the rectum that lies immediately above the pelvic diaphragm is dilated to form the rectal ampulla. It develops partly from hindgut and partly from cloaca both being endodermal in origin.

Curves of the Rectum :-

(1) Antero - posterior curves - Sacral flexure and perineal flexure

(2) Lateral curves - Upper, middly and lower, lateral curves

Periotneal relations :-

The peritoneum covers the anterior and lateral surface of the first third of the rectum and only the anterior surface of the middle, leaving the lower third devoid of peritoneum.

Visceral Relations :-

(i) Anteriorly :-

In males the upper 2/3 of the recum is related to rectovesical pouch with coils of intestine and sigmoid colon. Whereas lower 1/3 of rectum related to the base of urinary bladder, vas deferens and prostate. In females the upper 2/3 of rectum is related to rectouterine pouch with cois of intestine and sigmoid colon and lower 1/3 of rectum is related to the lower part of veins.

(ii) Posteriorly :-

The rectum is in contact with sacrum and coccyx, ano-coccygeal ligament, piriformis, coccygeus, levator ani, the sacral plexus and the sympathetic trunks.

Mucosal Folds :-

The mucous membrane of empty rectum shows two type of folds.

They are :-

1. Longitudinal folds
2. Transverse or Horizontal folds
3. Longitudinal folds-

These are transitory and are present in the lower part of an empty rectum and obliterrated by distension.

2. Transverse o Horizontal folds - (Houston's valves or plica transversalis). These are permanent and most marked in distended rectum.

(a) The upper fold lie near the upper end of rectum and projects from the right or the left wall. Sometimes it may encircle and partially constrict the lumen.

(b) The middle fold that is largest and most constant lies at the upper end of rectal ampulla and projects from the anterior and right wall.

(c) The lower fold that is inconstant lies 2.5 cms below the middle fold an projects the left wall.

Supports of the Rectum :-

(i) Waldeyer's fascia :-

It originates from the anterior surface of lower sacrum. It is strong vascular condensation that proceeds to the posterior aspects of the ano recal juction.

(ii) Denovillier's fascia :-

It intervenes between the rectum behind and the prostate and seminal vesicles or vagina anteriorly nut it is more close adherent to the rectum than to others.

(iii) Lateral ligaments of endopelvic fascia :-

The fibrous elements in this tissue are the part of the pelvic fascia and connect the parietal pelvic fascia on the side wall of the pelvis with the rectum.

(iv) The Pelvic flor :-

It is formed by the levator ani.

Anterial supply of Rectum and Anal Canal

(i) Superior recal artery :-

It is the continuation of inferior mesenteric artery. The left and right branches of superior rectal artery supply the upper and middle rectum.

(ii) **Middle rectal artery :-**

It arises at anterior division of iliac artery and supply the lower part of the recum and uppper part of the anal canal.

(iii) **Inferior rectal artery :-**

It supplies external and internal sphincters below the pectinate line.

(iv) **Median sacral artery :-**

It supplies to the posterior wall of ano-rectal junction and anal canal.

Venous Supply of Rectum and Anal Canal

(i) **Superior rectal veins :-**

The upper and middle rectum are drained by superior rectal veins which enter the portal system via inferior mesenteric vein.

(ii) **Middle rectal veins :-**

It drains the lower rectum and upper anal canal, which open into the internal iliac veins only.

(iii) **Inferior rectal veins :-**

It begins from the external rectal plexus and drains the lower part of anal canal.

(iv) **Internal rectal venous plexus (Haemorrhoidal Plexus) :-**

It lies in the submucosa of anal canal and drains mainly into the superior recal vein, but communicates freely with the external plexus and thus with middle and dinferior recal veins.

(v) **External rectal venous plexus :-**

It lies outside the muscular coat of the rectum and anal canal and communicates freely with the internal plexus.

(vi) **Anal veins :-**

These are arranged radially around the anal margin. They communicate with the internal rectal plexus and inferior rectal veins.

Lymphatic Supply of Rectum and Anal Canal

(i) Lymphatics from more than the upper half of the rectum pass along the superior rectal vessels to the inferior mesenteric nodes.

(ii) Lymphatics from the lower half of the rectum pass along the middle rectal vessels to the internal iliac nodes.

(iii) Above the pectinate line, thelymphatic drain with those of the recum into the internal iliac nodes.

(iv) Below the pectinate line, the lymphatics drain into the median group of superficial inguinal nodes.

Nerve Supply of Rectum and Anal Canal

(i) The rectum is supplied by both sympathetic (L1-L2) and parasympathetic (S2,3,4) nerves through superior rectal and inferior hypogastric plexuses.

(ii) Above the pectinate line- the anal canal is supplied by autonomic nerves, both sympathetic (inferior hypogastric plexus L1-L2) and parasympathetic (pelvic splanchnic, S2,3,4)

(iii) Below the pectinate line- It is supplied by somatic (injferior recatl S3,4) nerves.

(iv) Anal sphincters - The internal sphincter contracts by sympathetic nerves and relaxes by the para-sympathetic nerves. The inferior rectal and perineal branch-or fourth sacral nerve supplies external sphincter.

Surgical Spaces :-

These are potential spaces surrounding the ano-rectal canal and are sites for collection of pus which might result in the formation of abscesses and fistulae.

1. Ischiorectal spaces :-

There is a fossa situated both sides of anal canal. It sia situatd on the pelvic diaphragm. Its base is towarsds surface and apex upwards. Apart from these, there is a thin band of tissue interventing between the ischiorectal fossae posteriorly, which is still a weaker pint and permits entery of pus from one fossa to the other, there by producting a horseshoe abscess in the posterior perianal region.

2. Pelvirectal Spacs :-

It is made up of losse connective tissu above levator ani. It is divided into anterior and posterior regions of laterla ligament of rectu, These spaces can hold good amount of pus.

3. Submucous space :-

It is situated above the shite ine of Hiliton between the mucous membrane and internal sphincter.

4. Perianal space :-

It surrounds the anal canal below the white line. It extnds from white line of hilton medially ot pudendal canal laterally.

5. Retrorectal Space :-

It lies in the forward concavity of the sacrum. It is bounded anteriorly by rectal wall, posteriorly by prevertebral fascia of sacrum, superiorly by peritoneal reflexion, inferiorly by pelvic diaphragm and laterally by laterally by lateral litaments fo rectum.

6. Intersphinteric space :-

This space is lying between the external & internal sphincter & considered important by some surgeion in genesis of abscesses in the region of anus and anal canal because the anal inermuscular glands terminate in this space.

7. Post anal space :-

It lies directly behind the Rectum and is divided by anococcygeal ligament in to following :

1. Superficial space
2. Deep (Retro sphincteric space of Courtney)

Left and rith Ischiorectal fossas communicate through this spac which allows posterior anal sepsis to result in horse shoe fistulae and abscess.

Physiology of the Rectum and Anal Canal

The function of the ano-rectal canal has to store and evacuate the faecal matter. This function is facilitated by the act of defecation. Defecation is an act of emptying of entire distal colon from the splenic flexure through the anal orifice in to the exterior, which is a reflex process.

The interval of the defecation varies from a day to 4-5 days, depending upon the nature of food taken. In majority of the people, this occurs once in a day.

Defecation mechanism :-

Most of the time rectum is empty of faeces. When a mass of faeces makes movement into rectum desire for defasecation is normally initiated includeing reflex contraction of recutm and relaxatiion of anal sphincter. Experimentally it has beem concluded that when the intraluminal pressure of rectum reaches about 20-25 cm of H2O the pressure receptors which not only detect the increas of pressure but also differentiates wether the increase in pressure in due to gas liquid or solid get stimulated.

Defecation reflexes :-

Threee kinds of relexes chiefly combine to from the defecation reflexes

1. Intrinsic reflex
2. Parasympathetic defecation reflex
3. Other reflexes

1. Intrinsic reflex :-

It is mediated by local enteric nervous system. When faeces enter the rectum, its distention initiats afferent signals that spread through the myenteric plexus to initiate peristaltic waves in the descending colon, sigmoid and rectum, forcing faeces towards the anus. As the peristaltic wave approaches the anus the internal anal sphincter is relaxed by inhibitory signals from myentric plexus: if the external sphincter is consciously or voluntarily released at the same time, defecation will occur.

2. Parasympathetic defecation refiex :-

The intrinsic reflex functioning by itself in relatively weak, to be effective in causing defecation, Unless fortified by the parasympathetic defecation reflex the job is not completely done usually.

3. Other sreflexes :-

Afferent signal entering spinal cord initiate othe effects, such as taking deep breath, closure of the glottis and contraction of the abdominal wall muscles to force the faecal contents of colon downwards and at the same time cause the pelvic floor to extend down ward and pull outwared on the anal ring to evacuate the faeces.

Except in babies abd mentally inert people, the conscious mind in toiledt trained human beings then takes over voluntary control of the external sphincter and either relaxes it to allow defecation of occur of further contract it, after an instantaneous contraction of the same initidally, if the moment is of socially acceptable for defection. It so for long time the defecation reflex dies off after a few minutes and remains quiescent.

Normal anorectal function :-

1. The rectum function as a capacitance organ, holding 650-1200ml, where as daily stool output is s250-750 ml.
2. The anal sphincter mechanism allows defecation and continence. The internal sphincter accounts for 80% of resting pressure, whereas the external sphincter account for 20% of resting pressure and 100% of squeeze pressure. The internal and external sphincter are contracted at rest.
3. Continence requires normal capacitance, normal sensation at the transition zone about the dentate line, puborectalis function for solid stool, external sphincter function for fine control, and internal sphincter function for resting pressure. The puborectalis maintains the anorectal angle and contraction prevents solid stool passage.

1. **Orthocolic reflex :-**

This occurs when the person awakes from sleep assuming the reect position.

2. **Gastrocolic reflex :-**

This coccurs when the person is moving and taking food an liquids. The increased intra rectal pressure causes the relaxation of naly sphincters which is counteracted by voluntary contraction of external sphincter permit the act ot preced. It the delay is prolonged, a termporary reduction in the intensity of the urge may occur.

तत्र स्थूलान्त्रप्रतिबद्धमर्द्धपञ्चाङ्गुलं गुदमाहुः। तस्मिन् बलयस्तिस्त्रोऽध्यर्द्धांअङ्गुलान्तरसम्भूताः प्रवाहणी विसर्जनी संवरणी चेति।। (सु. नि. 2/5)

चतुरङ्गुलायताः सर्वास्तिर्यगेकाङ्गुलोच्छ्रिताः। (सु. नि. 2/5)
शंखावर्तनिभाश्चापि उपर्युपरि संस्थिताः।।

गजतालुनिभाश्चापि वर्णतः सम्प्रकीर्तिताः। रोमान्तेभ्यो यवाध्यर्द्धो गुदौष्ठः परिकीर्तितः। (सु. नि. 2/6)
प्रथमा तु गुदौष्ठङ्गुलमात्रे।। (सु. नि. 2/7)

अर्धपञ्चाङ्गुलस्तस्मिंस्तिस्त्रोऽध्यर्धाङ्गुलाः स्थिताः। वल्यः प्रवाहिणी तासामन्तर्मध्ये विसर्जनी।।
बाह्या संवरणी तस्या गुदौष्ठे बहिरङ्गुले। यवाध्यर्धः प्रमाणेन रोमाण्यत्र ततः परम्।। (अ. ह. नि. 7/4-5)

Applied Aspect

Understanding Anatomy of Rectum & Anal canal :-

As per Ayurveda guda is considered as:-

- One among the Pranayatans & Koshthangas mentioned as terminal part of Sathulantra in closed vicinity of Vasti.
- Comprised of Uttaraguda (seat of fecal matter collection (Pelvic segment of colon) and Adharaguda for passage out of fecal matter (Rectum and anal canal).
- Total length 4.5 Angula (9 cm) (whole of anal canal with distal segment of rectum below Houston's valve).
- There are present three vallies arranged obliquely from proximal to distal as Pravahini, Visarjani and Samvarni one above other at the distance of one and half angula. Arranged as shankhavartanibha resembeling the color of gajatalu.
- Gudaushtha is situated at the distance of half angula from romanta.
- Distal most valli Samvarni is situated one angula extending from Gudaushtha to Dentate line, visarjani extending from Dentate line to ano-rectal ring or inferior Houston's valve and pravahini extending from ano-rectal ring or inferior Houston's valve to middle Houston's valve.

Rectum as per contemporary literature :-

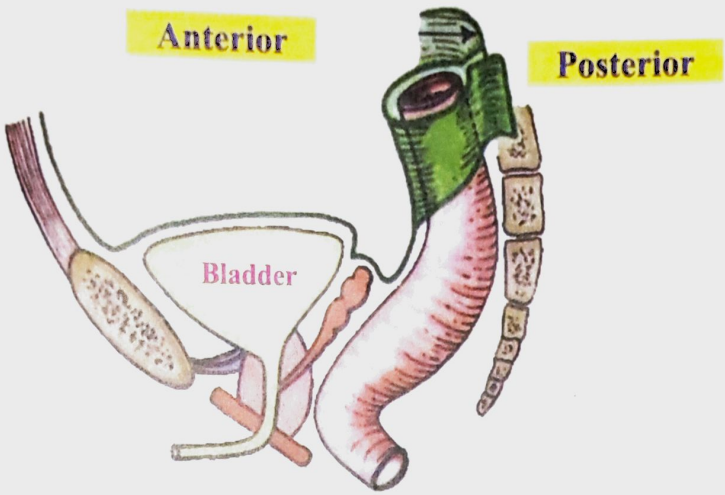
- The rectum is the last part of the large intestine and connects the sigmoid colon to the anal canal.
- The rectum begins at the height of S2-S3 and ends at the perineum directed downward and anteriorly.
- It is about 12 to 16 cm long und may be subdivided into three parts.

Peritoneal Relations :-

- The upper third lies intra-peritoneally.
- The middle third retro-peritoneally.
- The lower third under the pelvic diaphragm and therefore extra-peritoneally.

Relations

Peritoneal Relations



Morphological Features (Contd.) :-

- The rectum has two flexures:
- The sacral flexure (dorsal bend) results from the concave curvature of the sacrum.
- The perineal flexure (ventral bend) due to encirclement of the rectum by the levator ani muscle (pubo-rectal sling) in the region of transition of rectum to the anal canal (ano-rectal junction).
- Morphologically the rectum is similar to the rest of the large intestine. However it does not have taeniae, haustra, appendices epiploicae and semi-lunar folds.
- Main Characteristic are the three constant transverse folds (Houston's valves) situated at 4-7 c.m, 8-10 c.m and 10-12 c.m respectively from anal verge.

Mucosal Folds :-

- Two types:
- Transverse or horizontal, are permanent (Houston's valve) in upper part.
- Longitudinal or temporary, in lower part which disappear on distension.
- These folds are the reflections of the rectal mucosa which contains some fibers of circular muscular coat of rectal wall
- Serves as steps or spiral supports to modify the passage of faeces as it descends through rectum.
- The middle rectal fold (Kohlrausch's valve) is the strongest and located about 7 cm from the anus. Tumours below this fold may be palpable during digital rectal examination.
- The rectal ampulla (section between Kohlrausch's valve and ano-rectal junction) is quite stretchable and serves as a reservoir during defecation.

Arterial Supply :-

- The rectum is supplied by:
- The superior rectal artery (branch of the inferior mesenteric artery).
- Middle rectal artery (branch of the internal iliac artery).
- Inferior rectal artery (branch of the internal pudendal artery from the internal iliac artery).

Venous Return :-

- The venous drainage of the rectum is carried out by the superior, middle and inferior rectal veins.
- The superior rectal veins drain the upper part of the rectum into the portal venous system (through the inferior mesenteric vein).
- The middle and inferior rectal veins drain the lower part of the rectum into the internal iliac vein (systematic circulation) via the internal pudendal vein.
- Between those two different types of veins (the ones that drain to the hepatic portal system and the ones that drain systematic circulation) there are anastomoses, which are clinically important in cases of portal hypertension

Lymphatic drainage :-

- The lymph vessels course along the veins.
- Proximal rectal carcinoma metastasizes preferentially to the liver
- Whereas distal rectal carcinoma rather metastasizes to the lungs.

ANS Innervations :-

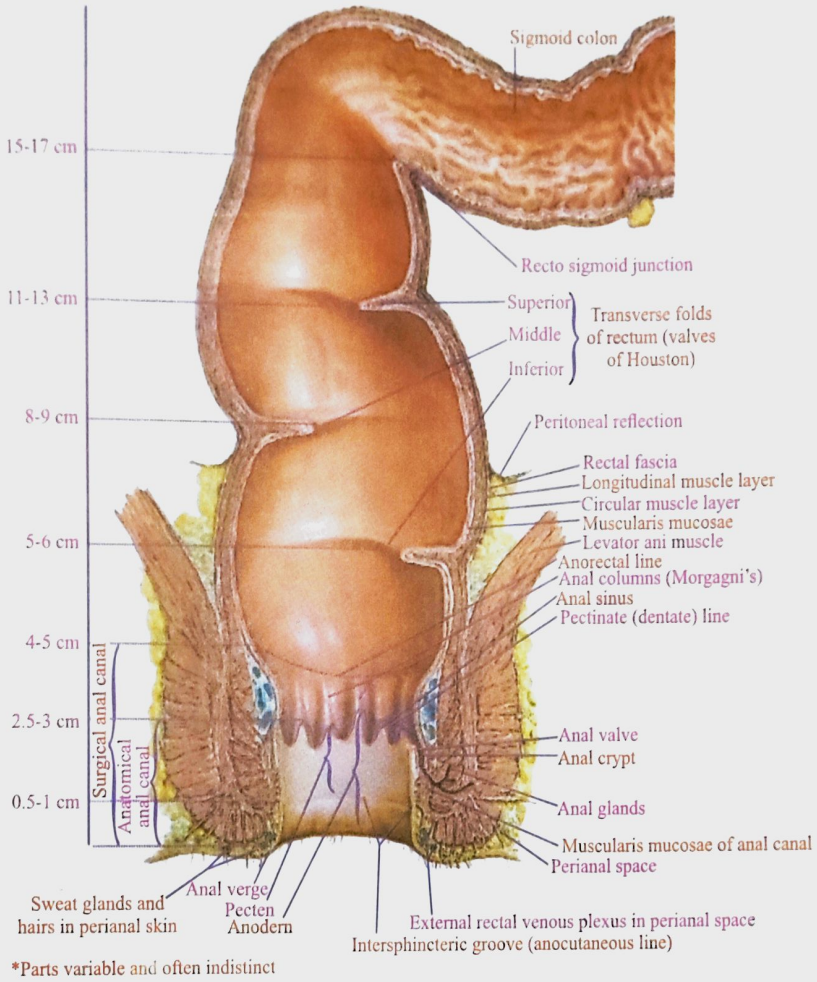
- The sympathetic innervation is carried by the inferior mesenteric plexus.
- The parasympathetic innervation by the pelvic splanchnic nerves and the inferior hypogastric plexus.

Physiological importance :-

- Similar to the colon electrolytes are absorbed (sodium, potassium, chloride) and indigestible food ingredients are decomposed by anaerobic bacteria. The stool is thickened through water absorption and is mixed with mucus.
- The rectum is an organ responsible for continence and plays an important role in the mechanism of defecation.
- Stool enters the rectal ampulla which is usually empty it is registered by stretch receptors. This information is transferred to the central nervous system giving the person an urge to defecate.
- The Subject can now decide to either initiate or delay the defecation by relaxing or tensing the levator ani muscle and sphincter ani externus muscle.
- The rising pressure in the ampulla leads to an increasing relaxation of the involuntary smooth corrugator cutis ani muscle and internal anal sphincter.
- The rectum facilitates the defecation through contractions.
- Additionally, the increased intra-abdominal pressure through the voluntary tension of the diaphragm and abdominal muscles (abdominal press) facilitates this act.

Understanding the location and lie of Anal Canal:

- In humans, the anal canal is approximately 2.5" to 4" long, from the anorectal junction to the anus. It is directed downwards and backwards. It is surrounded by inner involuntary and outer voluntary sphincters which keep the lumen closed in the form of an antero-posterior slit.
- Anal canal is traditionally divided into two segments, upper and lower, separated by the pectinate line (also known as the dentate line).



Upper Zone (Zona columnaris) :- Mucosa is lined by simple columnar epithelium.

Has longitudinal folds or elevations of tunica mucosa which are joined together inferiorly by folds of mucous membrane known as anal valves. This region has opening of Anal gland that secretes lymph discharge and built up faecal matter from the colon lining.

Supplied by the superior rectal artery (a branch of the inferior mesenteric artery)

Lower Zone :-

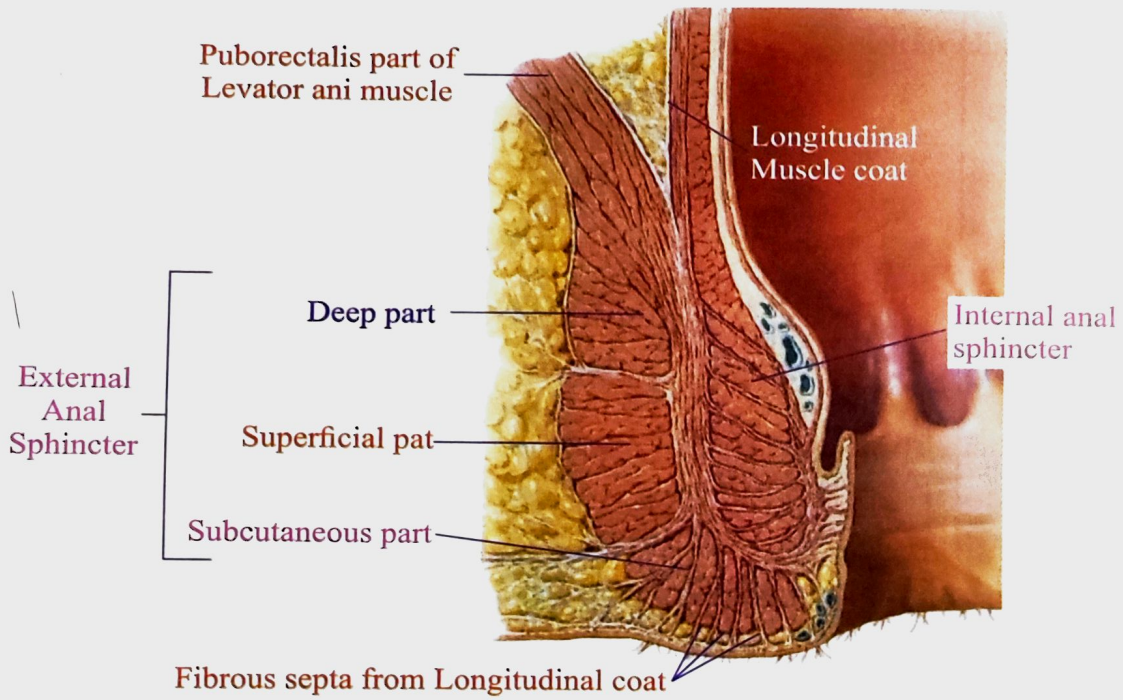
- Is divided into two smaller zones, separated by a white line known Hilton's line:
- Zona haemorrhagic - lined by stratified squamous non-keratinized epithelium.
- Zona cutanea - lined stratified squamous keratinized epithelium, which blends with the surrounding peri-anal skin.
- Supplied by the inferior rectal artery (a branch of the internal pudendal artery)

Anal verge :-

- This refers to the distal end of the anal canal, a transitional zone between the epithelium of the anal canal and the peri-anal skin.
- It should not be confused with the pectinate line between the upper and lower zones within the anal canal.

Musculature :-

- The external anal sphincter muscle is the voluntary muscle that surrounds and adheres to the anus at the lower margin of the anal canal. This muscle is in a state of tonic contraction, but during defecation, it relaxes to allow the release of faeces.
- Movement of the faeces is also controlled by the involuntarily controlled internal anal sphincter which is an extension of the circular muscle surrounding the anal canal. It relaxes to expel faeces from the rectum and anal canal.



Relations:-

- The ischio-anal fosse is on each side of the anal canal.
- The peri-anal space surrounds the anal canal below the white line.
- The sub-mucous space of the canal lies above the white line between the mucous membrane and internal anal sphincter muscle.

Precursor :-

- Hindgut/Proctodeum

Artery :-

- Superior Rectal Artery (above pectinate line) and Inferior rectal artery (below line)

Vein :-

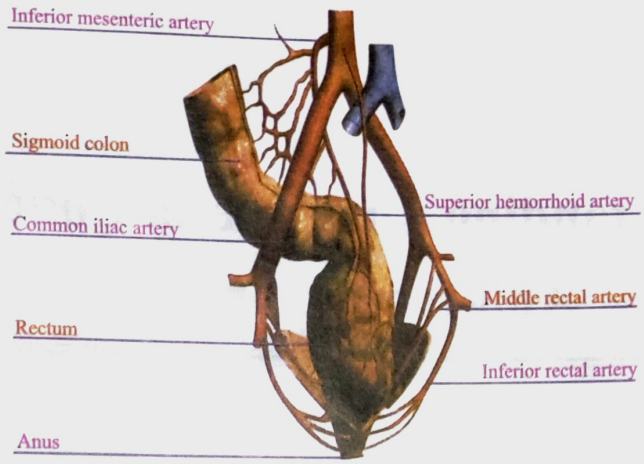
- Superior Rectal Vein (above pectinate line) and Inferior rectal vein (below line)

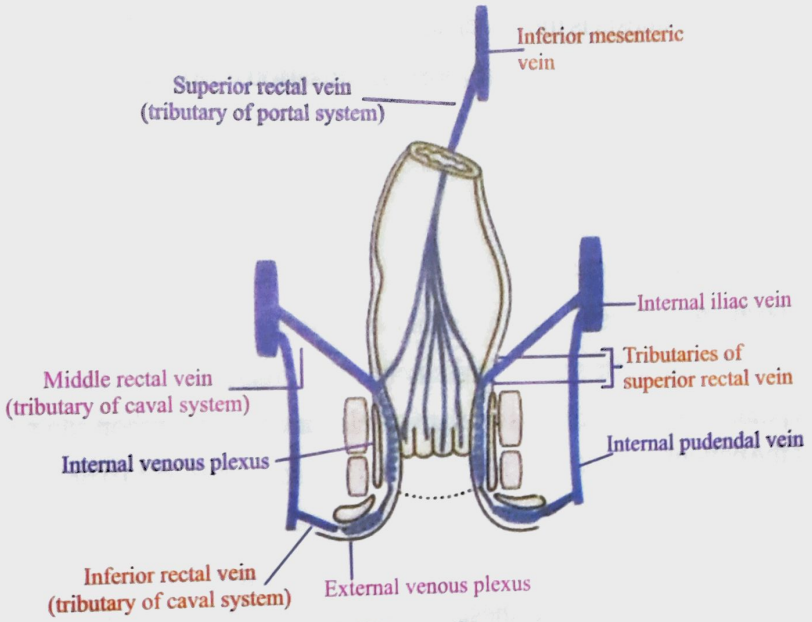
Nerve Supply :-

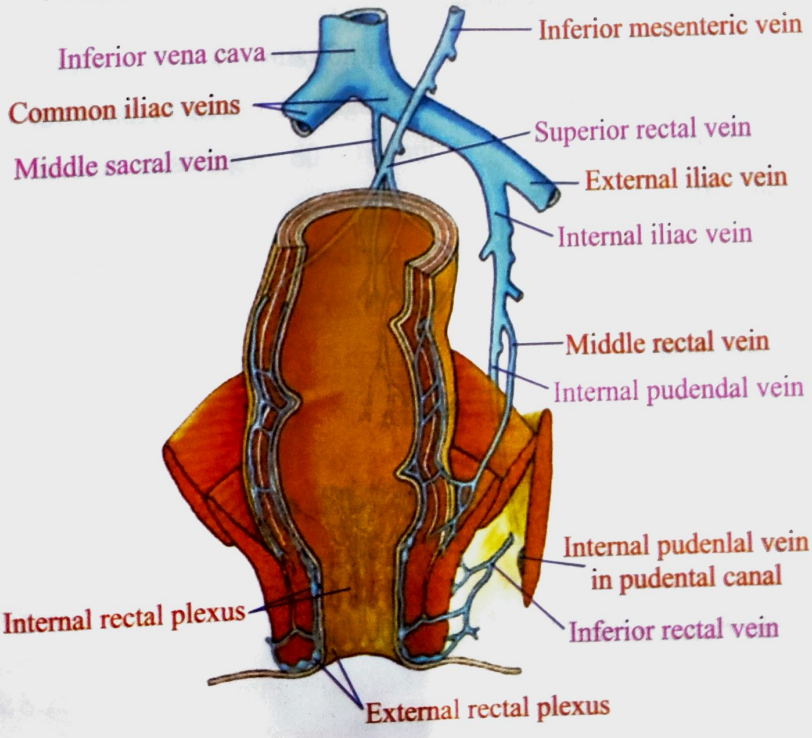
- Autonomic inferior hypogastric plexus (above pectinate line) and somatic inferior rectal nerve (below line)

Lymphatic Drainage :-

- Superficial inguinal lymph nodes (below pectinate line) and internal iliac lymph nodes (above line)


Inferior mesenteric artery
Sigmoid colon
Superior hemorrhoid artery
Common iliac artery
Middle rectal artery
Rectum
Inferior rectal artery
Anus


Inferior mesenteric vein
Superior rectal vein (tributary of portal system)
Internal iliac vein
Tributaries of superior rectal vein
Middle rectal vein (tributary of caval system)
Internal pudendal vein
Internal venous plexus
Inferior rectal vein (tributary of caval system)
External venous plexus


Inferior mesenteric vein
Inferior vena cava
Common iliac veins
Superior rectal vein
Middle sacral vein
External iliac vein
Internal iliac vein
Middle rectal vein
Internal pudendal vein
Internal pudenlal vein in pudental canal
Internal rectal plexus
Inferior rectal vein
External rectal plexus

Chapter - 4

Understanding Anaesthesia Concerning Ano-rectal Surgeries

Introduction :-

- Anesthesia or anaesthesia is the Greek term used in the sense of "without sensation".
- It is a state of controlled, temporary loss of sensation or awareness that is induced for medic purposes.

Components :-

- Analgesia
- Amnesia or and unconsciousness.
- Muscle relaxation.

Objectives of Anesthesia :-

- To obtain painless and motion less operative field. In which a surgeon can perform his/her best in th interest of the patient.

Pre –Procedure Preparations :-

- Pre- Anesthetic Examination.
- Decision concerning plan of Anesthesia.
- Plan for:
- Routine Investigations including (CBC, Bl. Sugar, RFT & LFT)
- Chest X-ray (if required)
- ECG (If required)
- Others
- Sensitivity test
- Advise of premedication.
- Advise for the local preparation over the site.
- Routine advises

Pre-Medication :-

- Drugs
- Atropine sulphate (0.01 mg/Kg body weight)
- Phenergan (1 mg/Kg body weight)
- Pentazocine/Nalbuphine

- Others Ranitidine/Ondacetrone etc.
- Preferably to be administered minimally 45 minutes - 1 hour before procedure or intravenous just before the procedure.

Minimal Requisite for Procedure Room :-

- Ensured availability of:
- Tipping Table
- Medical Oxygen delivery apparatus.
- I/V cannulation
- Suction Apparatus
- Efficient Assisting Staff
- Facility for monitoring of Vitals.
- Emergency Medicines and supports system for BLS & ACLS.

Types of Commonly used local anesthetic agents :-

Ester Group :-

Amide Group (Preferred Variety) :-

Another Classification :-

- Ultra-Short Acting (Procaine or Lignocaine without adrenaline) having effect for <30 min.
- Short Acting (2 % Lignocaine with adrenaline) having effect for 45-70 min.
- Moderately Acting (4 % Prilocaine with adrenaline) having effect for 90-150 min.
- Long Acting (0.5 % Bupivacaine) having effect for 180 min. or longer.

Lignocaine :-

Available with brand name xylocaine :-

- Available in the strength of 2%,4%,5% or 10%.
- 2% means 20mg & 4% means 40mg of Lignocaine is present in 1ml of drug.
- Available as both xylocaine plane or xylocaine with adrenaline variants.
- it gives anesthesia lasting for 60-90 minutes.

Bupivacaine :-

- Available with brand name **Sensorcaine.**
- Available in the strength of 0.25% or 0.5%.
- It gives anesthesia lasting for 3-6 hours.

Dose calculations :-

- **Xylocaine plane 4.0mg/kg body weight** (It means a patient having body weight 60 kg requires 60x4=240 mg of Lignocaine means 12ml of solution having strength of 2 % & 24 ml having strength of 1 %.)
- **Xylocaine with adrenaline 7mg/kg body weight.**
- (It means the same patient requires 420mg of lignocaine means 21 ml of solution having strength of 2% & 8.25 ml having strength of 5%.)
- **Bupivacaine** 2 mg/kg body weight.

Indications:-

Xylocaine plane:-

- Xylocaine sensitivity test.
- In patients having un-controlled hypertension.

Xylocaine with adrenaline:-

- Most commonly used

Bupivacaine:-

- Regional anesthesia
- Procedures of longer duration.
- Patients sensitive to xylocaine.

Lignocaine Sensitivity Test:-

- 0.01 ml of 2% plane xylocaine is given subcutaneously.
- Patient & the site of S/C injection is observed for any type of adverse reaction.
- Emergency kit should be kept ready for any type of adverse reaction.

Sensitivity Signs:-

- Itching at the site of injection.
- Peri-oral tingling sensations.

Symptoms & Signs of Over Dosage / Accidental Intravascular Injections:-

- All the local anesthetic drugs cause CNS stimulation followed by CNS depression.
- Bradycardia, hypotension & respiratory arrest.
- Cardio respiratory arrest leading to death.

Adverse Reactions:-

- Itching at the site of injection.
- Peri-oral tingling sensations.
- State of mental confusion & altered sensorium.
- Hypotension.
- Black out or fall.
- Respiratory arrest.
- Tremors leading to convulsions & then to comma.
- Death due to cardio-respiratory arrest.

Precautions:-

- Always do the prior sensitivity test.
- Always look for name expiry concentration & composition on the vial / ampoule containing drug before injecting anesthetic agent.
- Selection of drug should be very appropriate.
- Dose calculation should be very appropriate.
- Use the drug in in comparatively lower concentration.
- Always be sure that the drug is not being delivered intravascular.

Management for Adverse reactions:-

- Trendelenburg position.
- Airway management.
- IV line for hypotension.
- O2 Support
- Avil /Dexona for Anaphylactic shock.
- Deriphyllin for bronch-constriction.

Dilution method:-

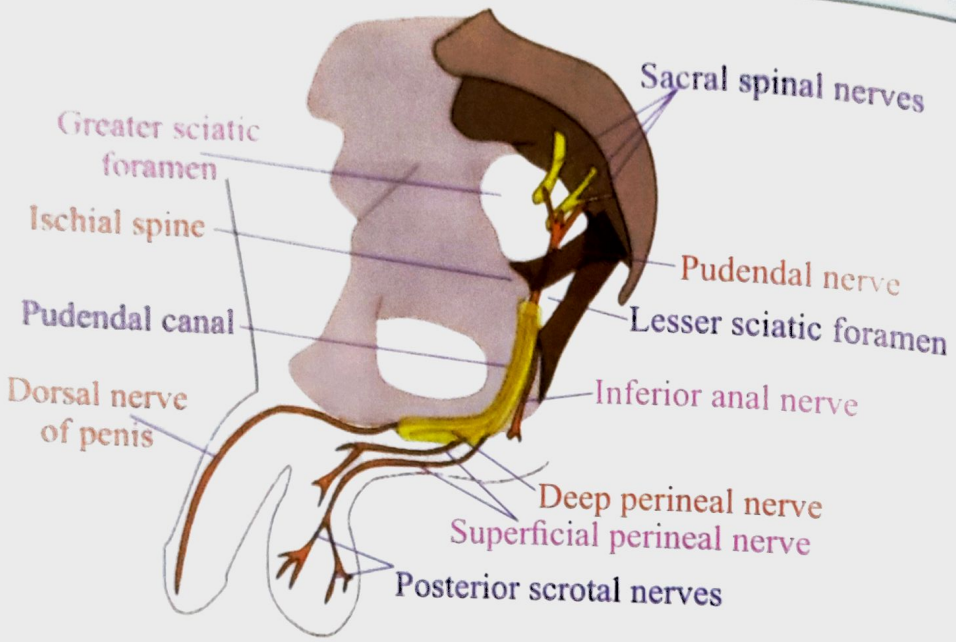
- **Objective:** Titration of local anesthetic agent from higher concentration to lower concentration (say from 2% to 1% or 0.5 %)
- Can be done using distilled water (preferable) or normal saline.
- In order to dilute 5ml of 2% lignocaine to 1 % 5ml of distilled water is required to be added to it.
- As now we are having 10 ml of 1% lignocaine, now if we want to further dilute it to 0.5 % then 10 ml of distilled water is required to be added to it.

Techniques:

- Topical anesthesia
- Infiltration anesthesia
- Field block
- Conduction Block
- Saddle Block
- Sedation or Short G.A

Topical Anesthesia:

- In the form of Sprays as Lignocaine 10 %.
- In the form of Emulsions (EMLA) as combination of Lignocaine and Priloca.ine)



Saddle Block :-

- Variant of LSAB
- Drug is invested in the sub-arachnoid space.
- Patient is made to sit on the edge of OT Table for nearly 10-12 min.
- Excellent mode to anaesthetize the Perineum for rectal or anal canal surgeries.

Caudle Block :-

- Drug is invested in the Caudal canal in Sacral Hiatus space.
- Patient is made to lie in prone position OT Table for Block.
- Blind Technique with higher failure incidences

Sedation or General Anesthesia :-

- Indicated for patients with poor acceptability towards Local anesthesia.
- Patients requiring significant muscle relaxation for the approach towards the lesion.
- Sedation/ Short G.A / G.A with muscle relaxation may be required.

Standard instructions :-

- Mainly required for the patients posted under saddle block or Sedation/Short G.A/ G.A.
- Nil orally for minimal 6-12 hours (may varies according to the type of anesthesia and procedure performed).
- Standard nursing in post operative phase.
- Standard Monitoring on regular interval.

Chapter -5

Commonly encountered unwanted scenarios while performing ano-rectal surgeries

Para-sympathetic overactivity :-

Para-sympathetic segment of ANS has a cranio-sacral outflow. Any sort of intervention in perianal region leading to severe pain or discomfort leads to parasympathetic overactivity that expresses in the form of neurogenic shock. These interventions may include:

1. Stretching of the anal verge
2. Par-rectal Examination (DRE)
3. Inadvertent Proctoscopy and usage of Anal Speculum for Ano-rectal examination
4. Diagnostic interventions done without proper preparations & precautions.
5. Surgical & para-surgical interventions done under the inadequate anaesthesia
6. Poor post operative pain management.

Presentation :-

1. Altered Sensorium
2. Un-consciousness
3. Bradycardia induced hypotension

Preventive measures :-

1. Proper pre-medication using Atropine sulphate .01mg/kg through I/M (approx. 30-45 min. prior) or I/V route (immediately before procedure).
2. To be remain gentle during ano-rectal examinations.
3. Ensuring adequate anaesthesia during the procedure.
4. Effective post operative pain management.

Management :-

1. Management in Trendelenburg position.
2. IV fluids
3. O2 inhalation
4. Inj. Atropine Sulphate 0.2 mg I.V diluted in 1:3 ratio.
5. Proper pain management.

In-adequate pain Control :-

Cause :-

1. Improper selection of anaesthesia.
2. Improper administration of anaesthesia.

Prevention :-

Proper selection of anaesthesia. In case of conditions like Ano-rectal abscesses & fistulae with significan infective loads it is sometime very difficult to attain the effect of infiltrative anaesthesia.so the saddle or LSAB ca be appropriate option in regard to the selection of anaesthesia.

Primary haemorrhage :-

Cause :-

- Inadvertent dissection in the perineum.

Prevention :-

- Planned cautious dissection keeping in the due concern the regional anatomy.

Management :-

- Proper identification and ligation/cauterisation of the bleeder.
- Proper pressure and packing of the wound.

Reactionary haemorrhage :-

Causes :-

- Improper wound care (wound dressing) in early post-operative period.
- Improper pain management.

Prevention :-

- Proper wound care (wound dressing) in early post-operative period.
- Proper pain management.

Urinary Retention :-

Cause :-

1. May be due to effect of Anaesthesia (LSAB)
2. Spasm of the Sphincter vesical region owing to pain in perineum due to surgical intervention.
3. Presentation: inability to void urine despite of the urge.
4. Pain & fullness in hypogastric region.

Management :-

1. Fomentation in Hypogastric region.
2. Adequate pain management.
3. Administration of Antispasmodics.
4. Encouraging the patient to pass the urine.
5. Catheterisation.

Constipation :-

Cause :-

1. Post procedure spasm in perianal region owing to surgical intervention.
2. Reluctance owing to the fear of pain.
3. Improper dietary intake.

Management :-

1. Proper wound care in post operative period.
2. Adequate pain management.
3. Proper dietary management through adequate intake of fibres & stool softener.

Post procedure pain:-

Cause :-

1. In-adequate analgesia.
2. Unexplored infective foci, Inadvertent dissection, ligatures & packs leading to persistent inflammation & induration.

Management :-

1. Judicious administration of analgesia.
2. Effective drainage of infective foci,
3. Removal of the ligatures & packs responsible for persistent inflammation & induration.

Post operative Sepsis :-

Causes :-

1. Improper access and drainage of the infective focus & lesion.
2. Post procedure sepsis due to flaw in asepsis.
3. Retained unwanted setons/sutures or packs.
4. Faecal contamination of the site.

Presentation :-

1. Findings like persistent inflammation, pain & fever S/O infective aetiology.
2. Findings S/O septic shock (early warm or late cold stage)

Management :-

1. Strict asepsis during and after procedure.
2. Proper access and drainage of the infective focus & lesion.
3. Prevention of faecal contamination.
4. Proper selection and administration of the antibiotics.

Prolapse :-

Cause :-

1. Usually encountered in the cases of Haemorrhoids (Gr. IV) managed with the ligation & plication technique due to the venous congestion or accumulation of inflammatory exudates.

Prevention :-

2. Proper selection of the procedure as per its progress.

Management :-

1. Proper administration of anti-inflammatory drugs and measures.
2. Proper and early management for prolapsed segment by early reposition.

Discharge :-

Cause :-

- Usually encountered in the cases of haemorrhoids (Gr. IV) managed with the cryosurgery, ligation & plication technique due to inflammatory exudates.
- Improper and injudicious usage of setons.

Management :-

- Proper selection of the procedure.
- Proper and judicious usage of setons.

Secondary haemorrhage :-

Cause :-

1. Procedural Flaws.
2. Poor control of infection.

Management :-

1. Proper identification of the cause.
2. Effective management of the haemorrhage.

Delayed Healing :-

Cause :-

1. Inadvertent dissection.
2. Persistent infective foci.
3. Retained foreign material.
4. Excessive fibrosis.

Management :-

1. Proper Identification and management of the underlying cause.

Faecal Incontinence :-

- Inadvertent dissection leading to the sphincter damage.

Presentation :-

1. Incontinence to flatus and faeces.
2. Soilage of the underclothes.

Management :-

- Requires repair of damaged sphincters.

Anal canal Strictures :-

Cause :-

1. Inadvertent dissection.
2. Excessive fibrosis owing to injudicious usage of agents like kshara or sclerosing agents.

Presentation :-

- Incomplete evecuation with the presentation of pipe like stool.
- Constipation.

Management :-

- Self Anal dilatation using anal dilators.
- Surgical repair like anoplasty it gives.

Chapter - 6

Applied Anatomy of Rectum & Anal Canal

As per Ayurveda :-

- One among the *Pranayatans* & *Koshthangas* mentioned as terminal part of *Sathulantra* in closed vicinity of *Vasti.*
- Comprised of *Uttaraguda* (seat of fecal matter collection (Pelvic segment of colon) and *Adharaguda* for passage out of fecal matter (Rectum and anal canal).
- Total length 4.5 *Angula* (9c.m) (whole of anal canal with distal segment of rectum below Houston's valve).
- There are present three *vallies* arranged obliquelly from proximal to distal *as Pravahini, Visarjani* and *Samvarni* one above other at the distence of one and half *angula. Arranged as shankhavartanibha* resembeling the color of *gajatalu.*
- *Gudaushtha* is situated at the distance of half angula from *romanta.*
- Distal most *valli Samvarni* is situated one *angula* extending from *Gudaushtha* to Dentate line, *visarjani* extending from Dentate line to ano-rectal ring or inferior Houston's valve and *pravahini* extending from ano-rectal ring or inferior Houston's valve to middle Houston's valve.

Rectum as per contemporary literature :-

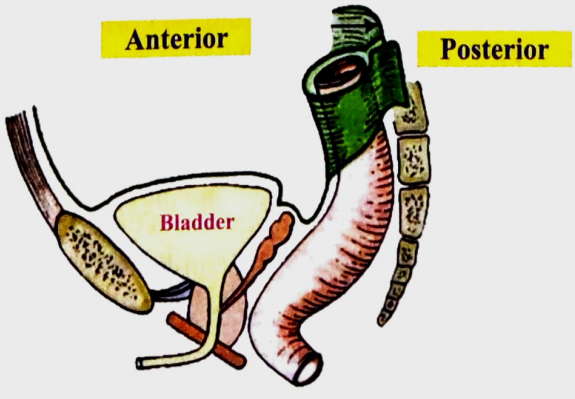
The rectum is the last part of the large intestine and connects the sigmoid colon to the anal canal.

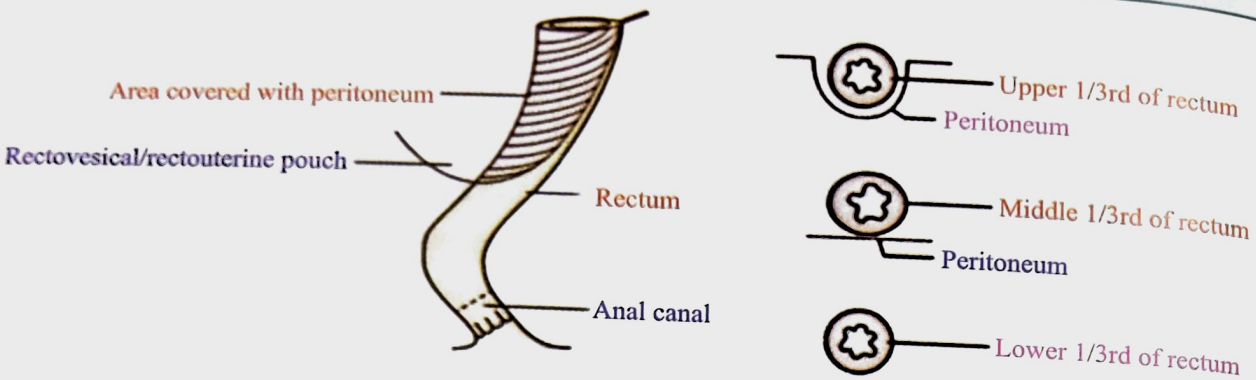
- The rectum begins at the height of S2-S3 and ends at the perineum directed downward and anteriorly.
- It is about 12 to 16 cm long und may be subdivided into three parts.

Peritoneal Relations :-

- The upper third lies intra-peritoneally.
- The middle third retro-peritoneally.
- The lower third under the pelvic diaphragm and therefore extra-peritoneally.

Relations **Peritoneal Relations**





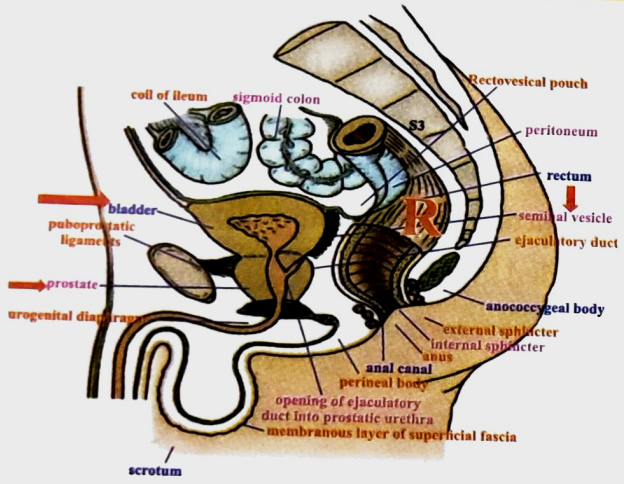
Relations of the rectum

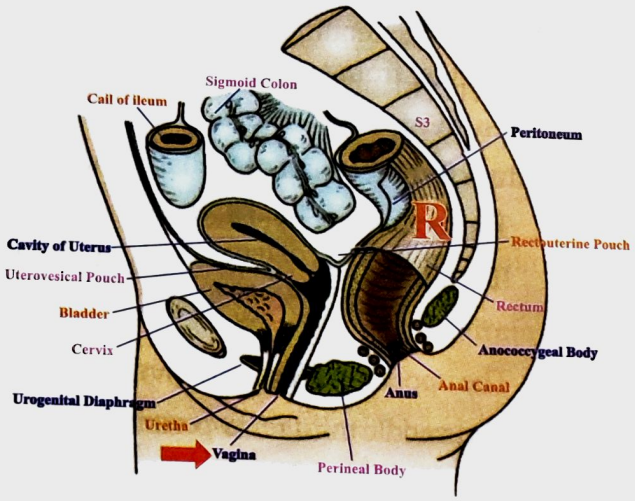
MALE PELVIS

- **Anterior :** seminal vesicles, posterior surfaces of urinary bladder & prostate gland
- **Posterior :** sacrum & coccyx

FEMALE PELVIS

- **Anterior :** posterior wall of vagina
- **Posterior :** sacrum & coccyx





Morphological Features (Contd.)

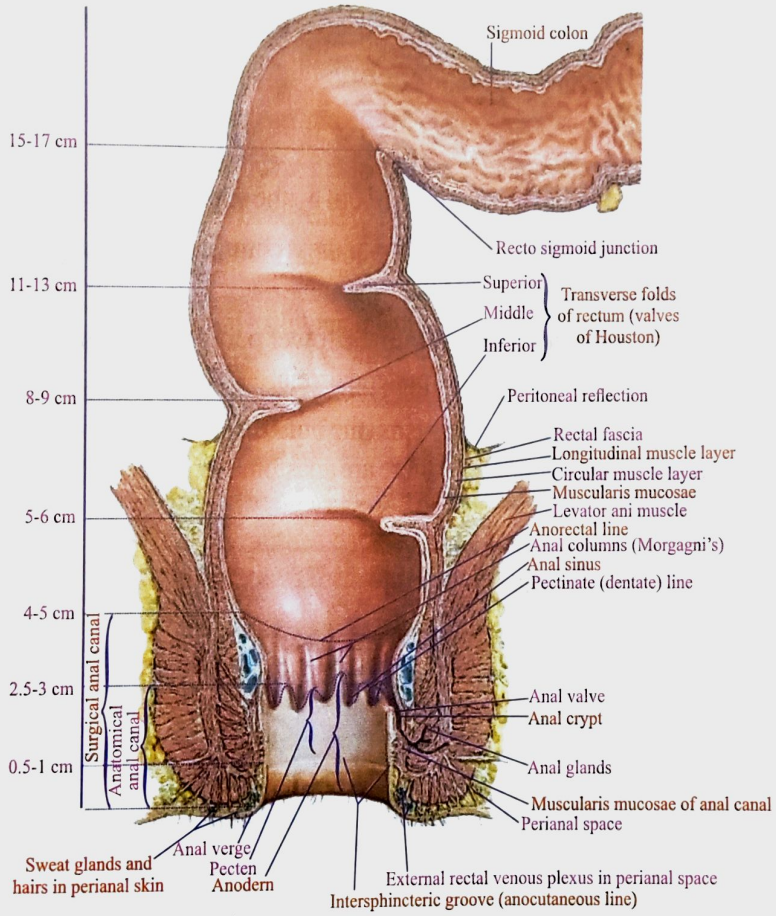
The rectum has two flexures :-

- The sacral flexure (dorsal bend) results from the concave curvature of the sacrum.
- The perineal flexure (ventral bend) due to encirclement of the rectum by the levator ani muscle (pubo-rectal sling) in the region of transition of rectum to the anal canal (ano-rectal junction).
- Morphologically the rectum is similar to the rest of the large intestine. However it does not have taeniae, haustra, appendices epiploicae and semi-lunar folds.
- Main Characteristic are the three constant transverse folds (Houston's valves) situated at 4-7 c.m. 8-10 c.m and 10-12 c.m respectively from anal verge.

Mucosal Folds :-

Two types :-

- Transverse or horizontal, are permanent (Houston's valve) in upper part.
- Longitudinal or temporary, in lower part which disappear on distension.
- These folds are the reflections of the rectal mucosa which contains some fibers of circular muscular coat of rectal wall
- Serves as steps or spiral supports to modify the passage of faeces as it descends through rectum.
- The middle rectal fold (Kohlrausch's valve) is the strongest and located about 7 cm from the anus. Tumours below this fold may be palpable during digital rectal examination.
- The rectal ampulla (section between Kohlrausch's valve and ano-rectal junction) is quite stretchable and serves as a reservoir during defecation.



*Parts variable and often indistinct

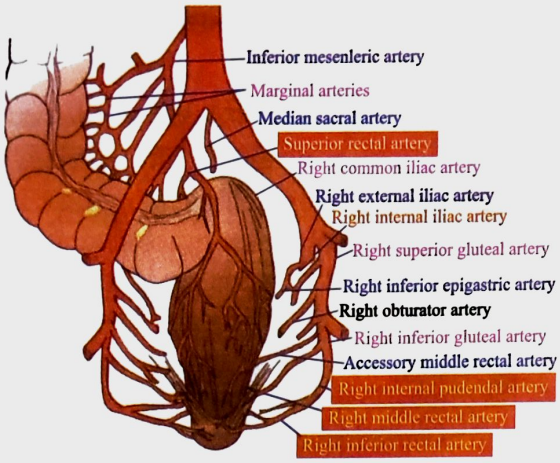
Arterial Supply :-

The rectum is supplied by :-

- The superior rectal artery (branch of the inferior mesenteric artery).
- Middle rectal artery (branch of the internal iliac artery).
- Inferior rectal artery (branch of the internal pudendal artery from the internal iliac artery).

Blood supply of the rectum

- **Arterial supply**

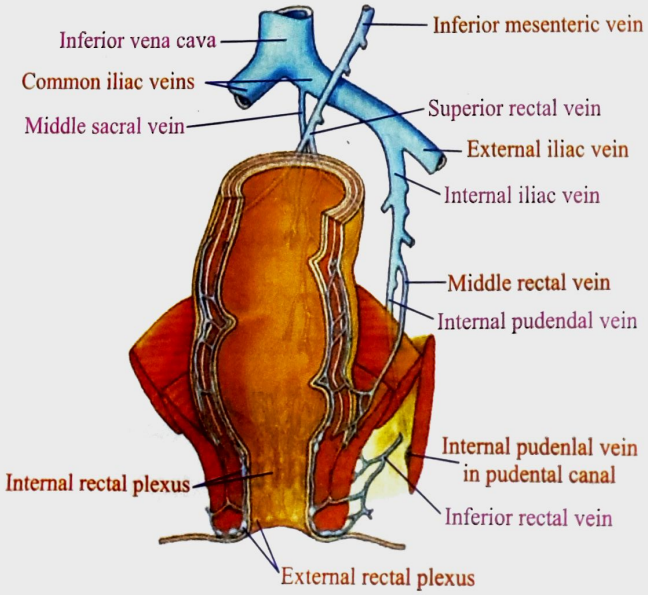


Venous Return:-

- The venous drainage of the rectum is carried out by the superior, middle and inferior rectal veins.
- The superior rectal veins drain the upper part of the rectum into the portal venous system (through the inferior mesenteric vein).
- The middle and inferior rectal veins drain the lower part of the rectum into the internal iliac vein (systematic circulation) via the internal pudendal vein.
- Between those two different types of veins (the ones that drain to the hepatic portal system and the ones that drain systematic circulation) there are anastomoses, which are clinically important in cases of portal hypertension

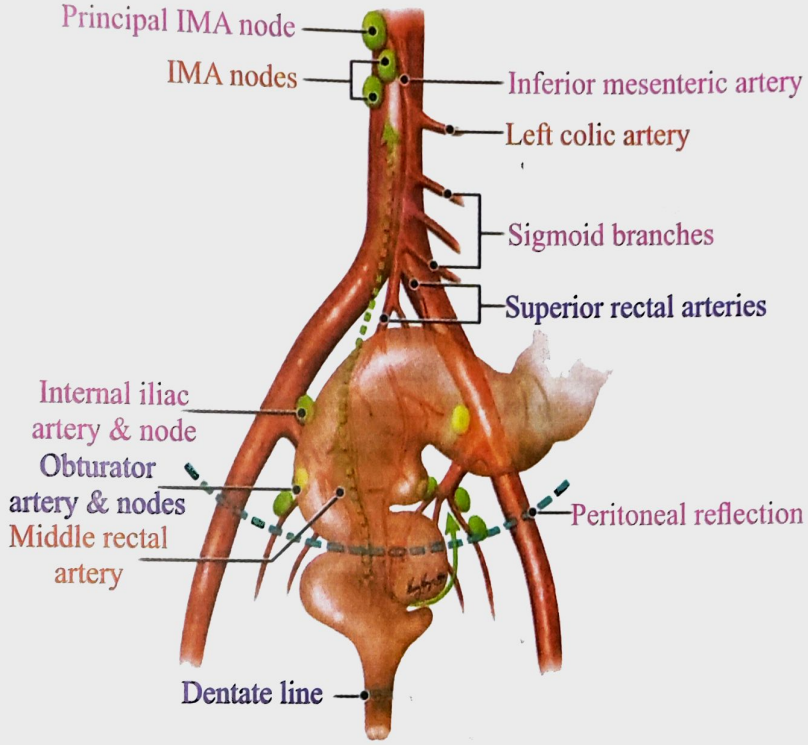
Blood supply of the rectum

- **Venous drainage**



Lymphatic drainage :-

- The lymph vessels course along the veins.
- Proximal rectal carcinoma metastasizes preferentially to the liver
- Whereas distal rectal carcinoma rather metastasizes to the lungs.



ANS Innervations:-

- The sympathetic innervation is carried by the inferior mesenteric plexus.
- The parasympathetic innervation by the pelvic splanchnic nerves and the inferior hypogastric plexus.

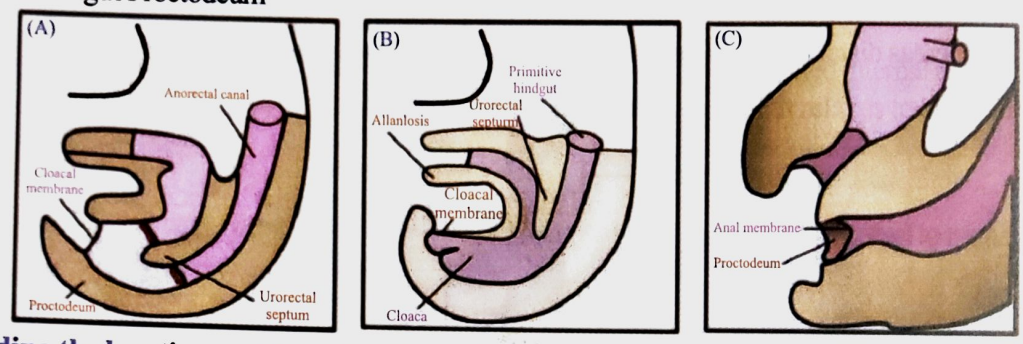
Physiological importance: -

- Similar to the colon electrolytes are absorbed (sodium, potassium, chloride) and indigestible food ingredients are decomposed by anaerobic bacteria. The stool is thickened through water absorption and is mixed with mucus.
- The rectum is an organ responsible for continence and plays an important role in the mechanism of defecation.
- Stool enters the rectal ampulla which is usually empty it is registered by stretch receptors. This information is transferred to the central nervous system giving the person an urge to defecate.
- The Subject can now decide to either initiate or delay the defecation by relaxing or tensing the levator ani muscle and sphincter ani externus muscle.
- The rising pressure in the ampulla leads to an increasing relaxation of the involuntary smooth corrugator cutis ani muscle and internal anal sphincter.
- The rectum facilitates the defecation through contractions.
- Additionally, the increased intra-abdominal pressure through the voluntary tension of the diaphragm and abdominal muscles (abdominal press) facilitates this act.

Anal Canal :-

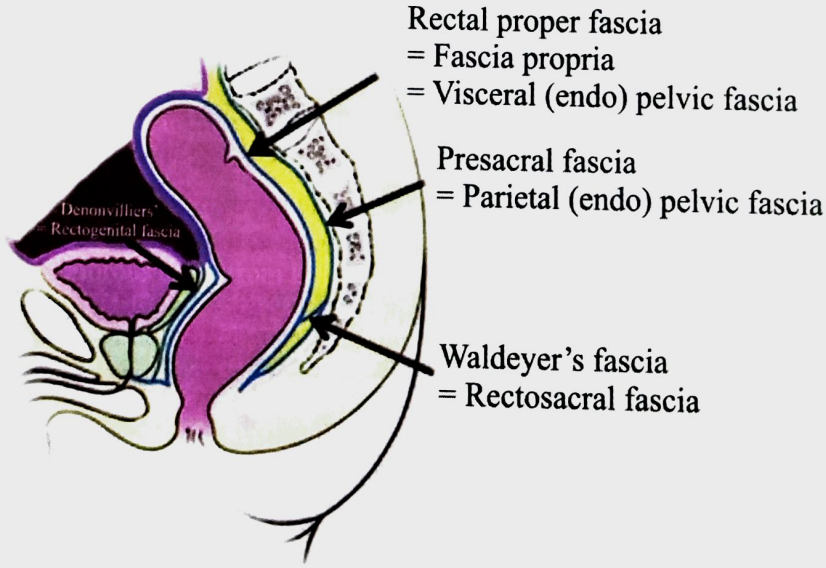
Embryonic development of Anal Canal :-

- Hindgut/Proctodeum



Understanding the location and lie of Anal Canal :-

- In humans, the anal canal is approximately 2.5" to 4" long, from the anorectal junction to the anus. It is directed downwards and backwards. It is surrounded by inner involuntary and outer voluntary sphincters which keep the lumen closed in the form of an antero-posterior slit.
- Anal canal is traditionally divided into two segments, upper and lower, separated by the pectinate line (also known as the dentate line).



Upper Zone (Zona columnaris) :- Mucosa is lined by simple columnar epithelium.

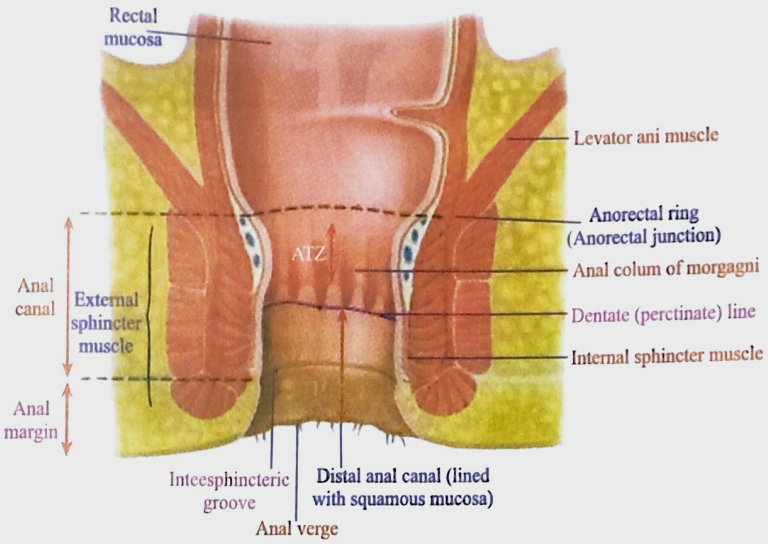
- Has longitudinal folds or elevations of tunica mucosa which are joined together inferiorly by folds of mucous membrane known as anal valves. This region has opening of Anal gland that secretes lymph discharge and built up faecal matter from the colon lining.
- Supplied by the superior rectal artery (a branch of the inferior mesenteric artery)

Lower Zone:-

- Is divided into two smaller zones, separated by a white line known Hilton's line:
- Zona haemorrhagic - lined by stratified squamous non-keratinized epithelium.
- Zona cutanea - lined stratified squamous keratinized epithelium, which blends with the surrounding peri-anal skin.
- Supplied by the inferior rectal artery (a branch of the internal pudendal artery)

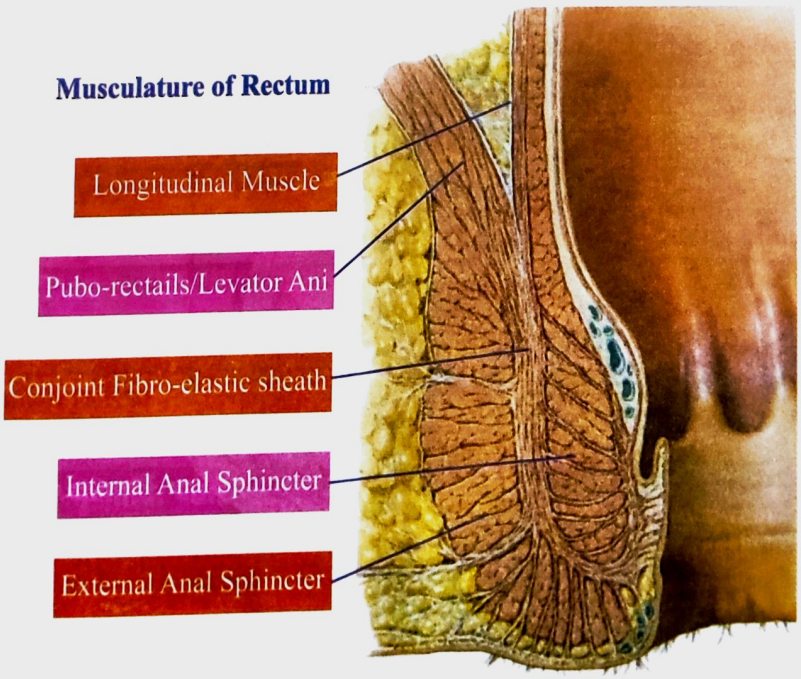
Anal verge:

- This refers to the distal end of the anal canal, a transitional zone between the epithelium of the anal canal and the peri-anal skin.
- It should not be confused with the pectinate line between the upper and lower zones within the anal canal.



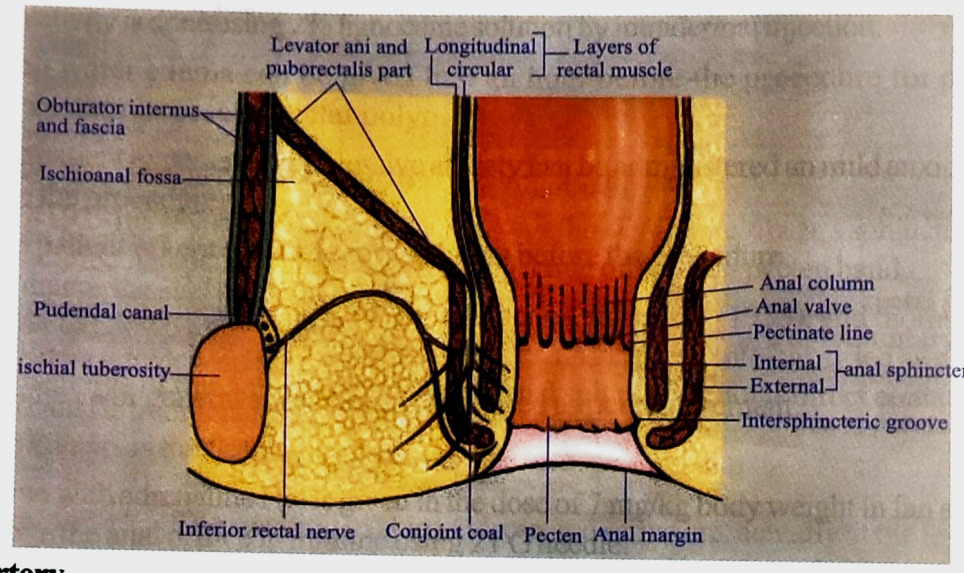
Musculature :-

- The external anal sphincter muscle is the voluntary muscle that surrounds and adheres to the anus at the lower margin of the anal canal. This muscle is in a state of tonic contraction, but during defecation, it relaxes to allow the release of faeces.
- Movement of the faeces is also controlled by the involuntarily controlled internal anal sphincter which is an extension of the circular muscle surrounding the anal canal. It relaxes to expel faeces from the rectum and anal canal.



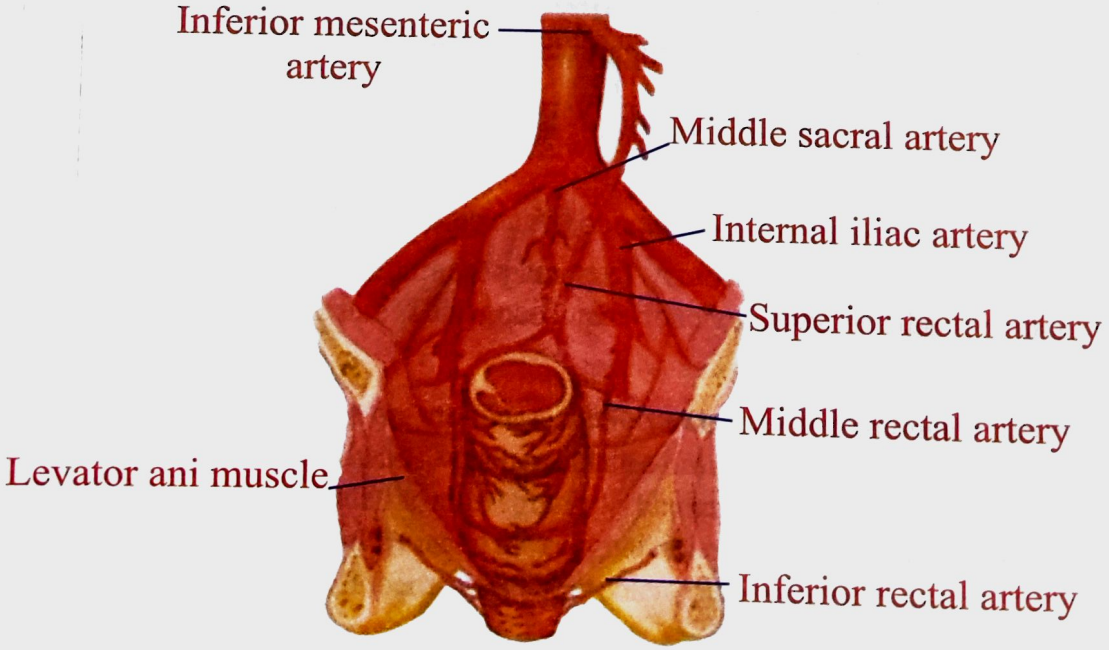
Relations:-

- The ischio-anal fosse are on each side of the anal canal.
- The peri-anal space surrounds the anal canal below the white line.
- The sub-mucous space of the canal lies above the white line between the mucous membrane and internal anal sphincter muscle.



- **Artery**
- Superior Rectal Artery (above pectinate line) and Inferior rectal artery (below line)

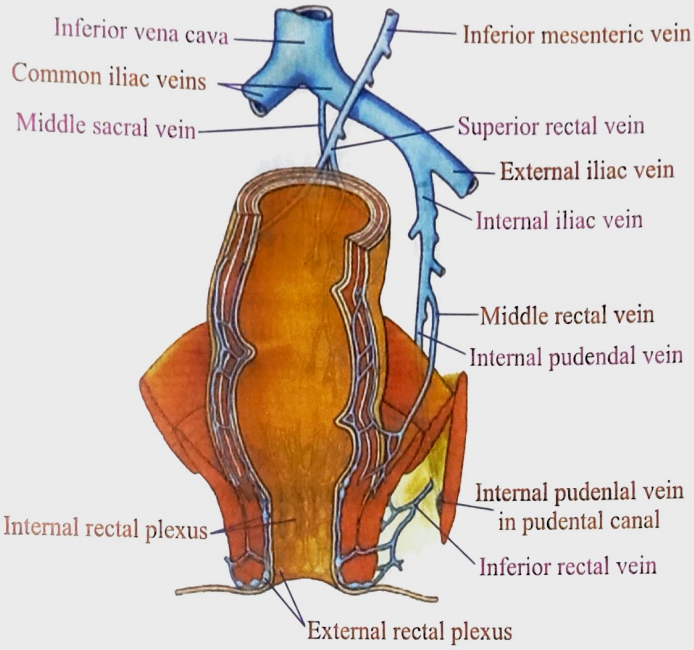
Arterial supply :-



Vein :-

- Superior Rectal Vein (above pectinate line) and Inferior rectal vein (below line)

Venous drainage :-

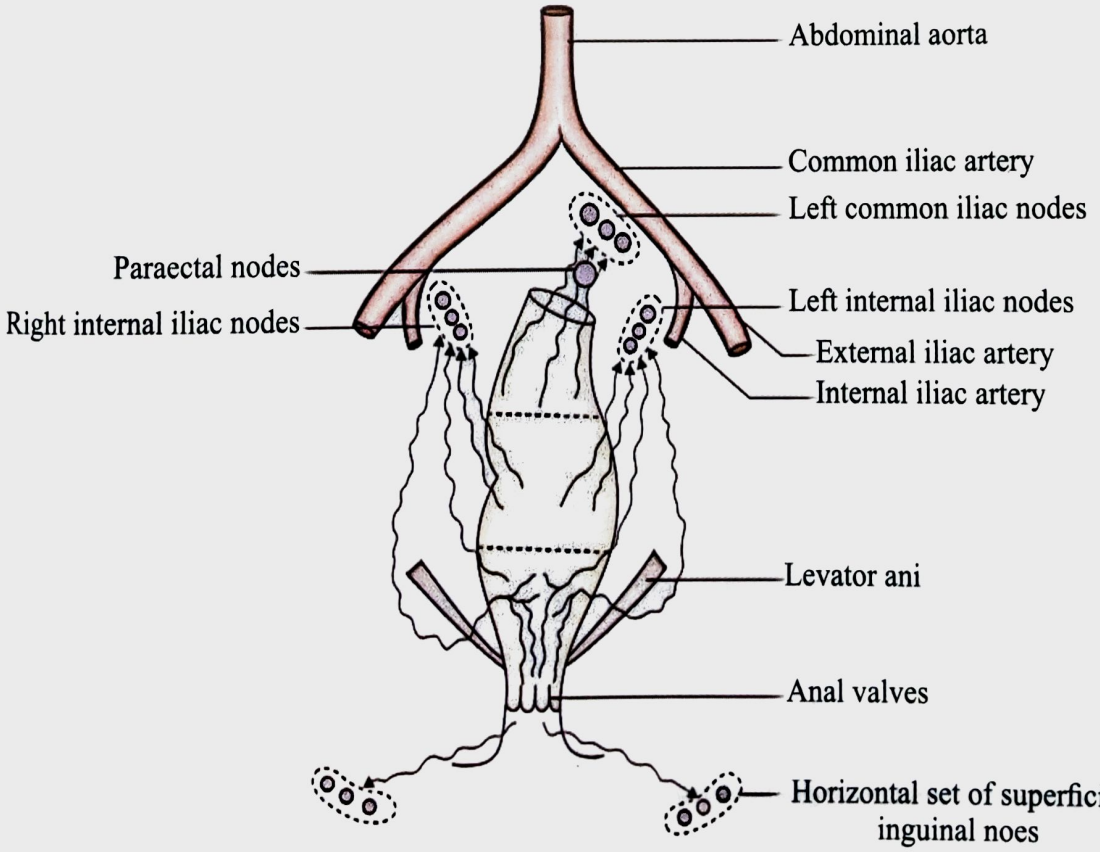


Nerve Supply

- Autonomic inferior hypogastric plexus (above pectinate line) and somatic inferior rectal nerve (below line)

Lymphatic Drainage

- Superficial inguinal lymph nodes (below pectinate line) and internal iliac lymph nodes (above line)



Chapter - 7

Understanding Anaesthesia Concerning Ano-rectal Surgeries

Introduction :-

- Anesthesia or anaesthesia is the Greek term used in the sense of "without sensation".
- It is a state of controlled, temporary loss of sensation or awareness that is induced for medical purposes.

Components :-

- Analgesia
- Amnesia or and unconsciousness.
- Muscle relaxation.

Objectives of Anesthesia :-

- To obtain painless and motion less operative field. In which a surgeon can perform his/her best in the interest of the patient.

Pre –Procedure Preparations :-

- Pre- Anesthetic Examination.
- Decision concerning plan of Anesthesia.
- Plan for :
- Routine Investigations including (CBC, Bl. Sugar, RFT & LFT)
- Chest X-ray (if required)
- ECG (If required)
- Others
- Sensitivity test
- Advise of premedication.
- Advise for the local preparation over the site.
- Routine advise

Pre-Medication :-

- Drugs
- Atropine sulphate (0.01 mg/Kg body weight)

- Phenergan (1 mg/Kg body weight)
- Pentazocine/Nalbuphine
- Others Ranitidine/Ondacetrone etc.

Preferably to be administered minimally 45 minutes - 1 hour before procedure or intravenous just before the procedure.

Minimal Requisite for Procedure Room :-

- Ensured availability of:
- Tipping Table
- Medical Oxygen delivery ap paratus.
- I/V cannulation
- Suction Apparatus
- Efficient Assisting Staff
- Facility for monitoring of Vitals.
- Emergency Medicines and supports system for BLS & ACLS.

Types of Commonly used local anesthetic agents :-

- **Ester Group**
- **Amide Group (Preferred Variety)**

Another Classification :-

- Ultra-Short Acting (Procaine or Lignocaine without adrenaline) having effect for <30 min.
- Short Acting (2 % Lignocaine with adrenaline) having effect for 45-70 min.
- Moderately Acting (4 % Prilocaine with adrenaline) having effect for 90-150 min.
- Long Acting (0.5 % Bupivacaine) having effect for 180 min. or longer.

Lignocaine :-

Available with brand name xylocaine,

- Available in the strength of 2%,4%,5% or 10%.
- 2% means 20mg & 4% means 40mg of Lignocaine is present in 1ml of drug.
- Available as both xylocaine plane or xylocaine with adrenaline variants.
- It gives anesthesia lasting for 60-90 minutes.

Bupivacaine :-

- Available with brand name **Sensorcaine.**
- Available in the strength of 0.25% or 0.5%.
- It gives anesthesia lasting for 3-6 hours.

Dose calculations:-

- **Xylocaine plane 4.0mg/kg body weight** (It means a patient having body weight 60 kg requires 60x4=240 mg of Lignocaine means 12ml of solution having strength of 2 % & 24 ml having strength of 1 %.)

- **Xylocaine with adrenaline 7mg/kg body weight** (It means the same patient requires 420mg of lignocaine means 21 ml of solution having strength of 2% & 8.25 ml having strength of 5%.)
- **Bupivacaine** 2 mg/kg body weight.

Indications :-

Xylocaine plane :-

- Xylocaine sensitivity test.
- In patients having un-controlled hypertension.

Xylocaine with adrenaline :-

- Most commonly used

Bupivacaine :-

- Regional anesthesia
- Procedures of longer duration.
- Patients sensitive to xylocaine.

Lignocaine Sensitivity Test :-

- 0.01 ml of 2% plane xylocaine is given subcutaneously.
- Patient & the site of S/C injection is observed for any type of adverse reaction.
- Emergency kit should be kept ready for any type of adverse reaction.

Sensitivity Signs :-

- Itching at the site of injection.
- Peri-oral tingling sensations.

Symptoms & Signs of Over Dosage / Accidental Intravascular Injections :-

- All the local anesthetic drugs causes CNS stimulation followed by CNS depression.
- Bradycardia, hypotension & respiratory arrest.
- Cardio respiratory arrest leading to death.

Adverse Reactions :-

- Itching at the site of injection.
- Peri-oral tingling sensations.
- State of mental confusion & altered sensorium.
- Hypotension.
- Black out or fall.
- Respiratory arrest.
- Tremors leading to convulsions & then to comma.
- Death due to cardio-respiratory arrest.

Precautions :-

- Always do the prior sensitivity test.
- Always look for name expiry concentration & composition on the vial / ampoule containing drug before injecting anesthetic agent.
- Selection of drug should be very appropriate.
- Dose calculation should be very appropriate.

- Use the drug in in comparatively lower concentration.
- Always be sure that the drug is not being delivered intravascular.

Management for Adverse reactions :-

- Trendlenberg position.
- Airway management.
- IV line for hypotension.
- O2 Support
- Avil /Dexona for Anaphylactic shock.
- Deriphyllin for bronch-constriction.

Dilution method :-

Objective : Titration of local anesthetic agent from higher concentration to lower concentration (say from 2% to 1% or 0.5 %)

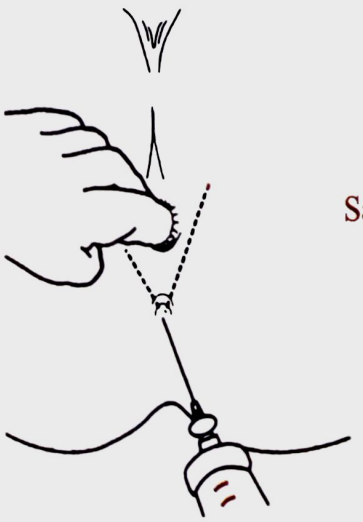
- Can be done using distilled water (preferable) or normal saline.
- In order to dilute 5ml of 2% lignocaine to 1 % 5ml of distilled water is required to be added to it.
- As now we are having 10 ml of 1% lignocaine, now if we want to further dilute it to 0.5 % then 10 ml of distilled water is required to be added to it.

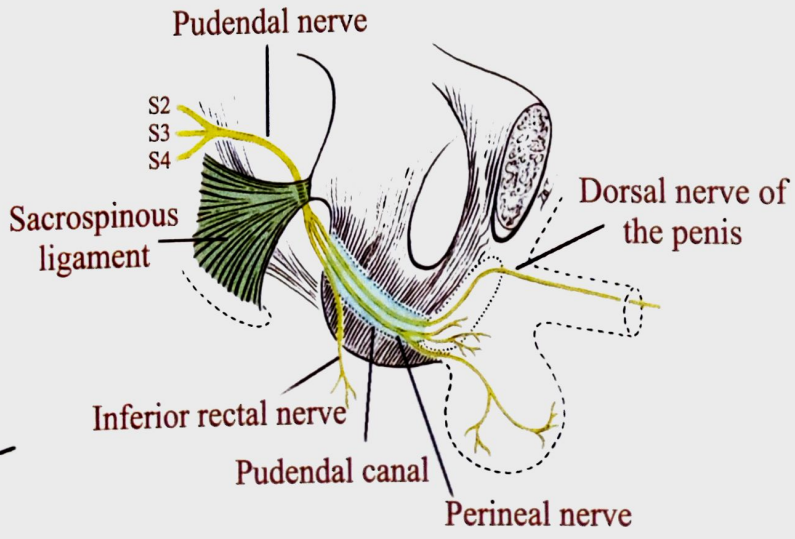
Techniques :-

- Topical anesthesia
- Infiltration anesthesia
- Field block
- Conduction Block
- Saddle Block
- Sedation or Short G.A

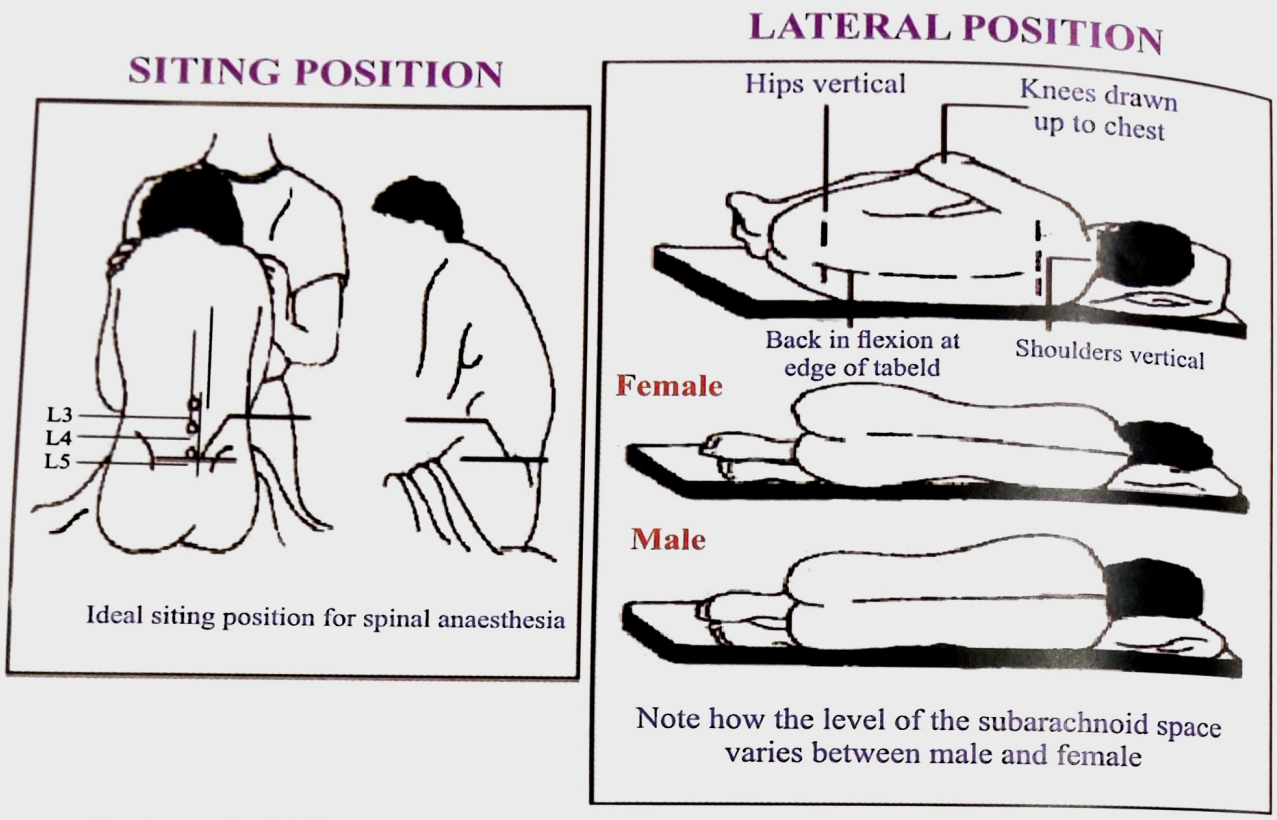
Topical Anesthesia :-

- In the form of Sprays as Lignocaine 10 %.
- In the form of Emulsions (EMLA) as combination of Lignocaine and Priloca.ine)





Saddle Block :-



- Variant of LSAB
- Drug is invested in the sub-arachnoid space.
- Patient is made to sit on the edge of OT Table for nearly 10-12 min.
- Excellent mode to anaesthetize the Perineum for rectal or anal canal surgeries.

Caudle Block :-

- Drug is invested in the Caudal canal in Sacral Hiatus space.
- Patient is made to lie in prone position OT Table for Block.
- Blind Technique with higher failure incidences

Sedation or General Anesthesia :-

- Indicated for patients with poor acceptability towards Local anesthesia.
- Patients requiring significant muscle relaxation for the approach towards the lesion.
- Sedation/ Short G.A / G.A with muscle relaxation may be required.

Standard instructions :-

- Mainly required for the patients posted under saddle block or Sedation/Short G.A/ G.A.
- Nil orally for minimal 6-12 hours (may varies according to the type of anesthesia and procedure performed).
- Standard nursing in post operative phase.
- Standard Monitoring on regular interval.

□□□□

Chapter - 8

Diagnosis of ano Rectal Disorders

The diagnosis should not be based on a spot diagnosis by shortcut history taking method but it mustbe based on the detail and complete history, clinical/physical examinations and supplemented by supportive investigations. In this way, triad of diagnosis includes history taking, physical examinations, supported by various investigations is of immense value in making the diagnosis of surigal lesion of Ano-rectal region. The history of a case related to anal problem was of little significance and everything depends on the physical examination, because of great accuracy in the examination of ano-rectal region, physical finding are of greater importance then symptomatology. However history taking is very important diagnostic device and an account of presenting complaints with duration including onset and past events including past treatment, narrated by the patients in his/her own language. The pattern of history recording should follow in sequence as under.

Subject :- Name, age, sex, religion, residence, occupation etc.

Chief complaint :- It is recorded in chronological order of their appearance. If few complaints start simultaneously, then they are recorded according to their severity.

History of present illness :- it contains form the beginning of first symptom and extends to the time of examination.

It includes mode of onset of symtpms, progress and the treatment which patient might have received.

Past History :- In case of fistula in ano previous history of anal canal disorders, history of tuberculosis, crohn's disease, ulcerative colitis, fissure in ano may be found. Habitual constipation is often associated with fissure in ano & internal piles. Prolapse may be preceded by dysentery or severe diarrhoea or constipation.

Drug History :- Patient is asked about all the drug he or she was taking. Special consideration is given to steriods, insulin, anti-hypertensives, diuretics, ergot derivatives, MAO inhibitors and HRT etc.

History of allergy :- Allergy to any drug or diet should be asked and mention on the Front page of file with red ink.

Personal History :- History of smoking, alcohol intake, diet, marital status and in case of females menstrual history and obstetric history.

Family History :- As many diseases rum in a family as DM, HT, piles adn fissure in ano.

History of immunization :- It is necessary in case of children as diphtheria, tetanus, tuberculosis, poliomyelitis, small pox etc.

Physical examination dominates in making a rectal diagnosis because it is the great diffculty which the average patinets experience, in describing rectal complaints with delicacy and precision. So it is advisable to break one of the rules of medical history taking deliberately leading questions regarding symptoms and their durtion.

Symptoms :-

(i)	Bleeding	(ii)	Prolapse	(iii)	Pain
(iv)	Discharge	(v)	Swelling	(vi)	Anal irritation
(vii)	Bowel habits	(viii)	Incontinence	(ix)	Abdominal pain
(x)	Loss of weight	(xi)	General health	(xii)	Previous illness
(xiii)	Previous operation				

1. **Bleeding :-**

3 things regarding bleeding should be asked

- Amount of bleeding
- Colour of blood loss
- Relation with faeces

Bright red blood - Coming form the rectum or anal canal.

Dark red - Coming from the ascending, transverse, descending or sigmoid colon.

Black i.e. melaena - From small intestine or higher.

Relation with faeces :-

(i) Blood mixed with faces means that the blood come from bowel higher than sigmoid colon.

(ii) Blood on the surface of faeces :- It usually comes from the rectum or anal canal.

(iii) Blood separate from the faeces - When bleeding occurs at some other time than defection e.g. CA rectum, diverticulosis, diverticulitis, Ulcerative colitis, polyp, prolapsed piles etc.

(iv) Blood in the toilet paper - in c/o minor bleeding from anal skin or fissure in ano or external haemorrhoids.

2. **Discharge of Pus/mucus :-** Purulent discharge coming from a sinus which soil the clothes occur in case of fistula in ano.

***In ulcerative* colitis :-** Blood stained, purulent offiensive discharge at the time of deafecation. Mucus discharge occurs in case of crohn's disease and colloid carcinoma of rectum.

3. **Pain :-** All the pathological conditions below the dentate line are painful and above it are painless provided they remain confined in rectal wall. Pathology beyond this is almost always painful either above or below dentate line.

Nature of pain and its relation with deafecation should be asked.

- Throbbing pain occurs in case of ano rectal abscess.
- Sharp recurring pain in anal fissure.
- Intermittent pain occurs in fistula in ano.
- Uncomplicated piles are usually painless. They become painful when get infected or strangulated.

Pain alone :- After deafecation - anal fissure, spontaneously at night-proctalgia fugax.

Pain with bleeding :- Anal fissure, anal carcinoma, rupture of ano rectal abscess, Thrombosed and strangulated pile.

Pain with lump :- Perianal haematoma, ano rectal abscess, carcinoma of anal canal

Pain with fistula :- Fistula in ano

Pain with something coming out with bleeding :- Haemorrhoids, prolapse rectum, prolapsed rectal polyp.

4. **Prolapse :-** Patients also complains of something coming out per anum during deafecation. That may be prolapsed rectum, polypus or long standing internal piles.

If prolapse is automatically reduced or it has to be pushed in anal canal.

If prolapse is slight, it is prolapse or if >3.75 cm it is complete prolapse i.e. procidentia.

5. **Bowel habits :-** In carcinoma rectum, the bowel habit is altered and nature of alteration depends on position of growth. Growth at pelvi-rectal junction or in sigmoid colon is usually of the annular type and increasing constipation is the earliest symptoms in these cases. Feeling of incomplete evacuation with sensation of fullness in the rectum occurs in case of proliferative growth in ampulla. In ulcerative growth, mucus, pus, blood and faeces accumulate overnight during night and the patient on rising from the bed gets an urgent call to evecuate i.e. spurious morning diarrhoea. In case of growth in lower part of rectum and anal canal pipe stem or tape like stool occurs. Tenesmus occurs in case of proliferative growth of ampulla of rectum.

6. **Pruitus ani :-** Can occur due to mucus discharge from the anus due to haemorrhoids, fissure, fistula, polyps, skin tags, condyloma etc.

Istruments :-

To conduct retal/anal examinations simple instruments are requried -

Examining table :- Which is usually height adjusting and have a lithotomy arrangement. Fixed table can also be used when work is to be done in trendelberg position. Goligher recommended distance of atleast 80 cms between ground and top of the table.

Lighting :- A good light source shall be placed behind the surgeon focusing the perianal area.

Surgical gloves :- Ordinary gloves can be used.

Lubricant :- Any lubricant can be used to facilitate progress of index finger into the anal canal.

Probes :- Probes of different sizes and shape shall be kept. Plastic wires and rubber catheter can also help.

Proctoscope :- Appropriate size of proctoscope shall be selected in each individual. Preferably proctoscope with inbuilt light source is used.

Rectal/anal speculam :- It is required sometime to locate the internal opening.

Sigmoidoscope/colonoscope :-

Position of rectal examination

1. **Genupectoral position (knee-shoulder position) :-** Best position for rectal examination, but certainly inconvenient and embarrassing position especially for women.
2. **Left-lateral or Sims' position :-** For this left hip should rest on small sand bag placed immediately adjacent to surgeon side of couch, his trunk should lie obliquely across couch cup and his hip should be flexed to an angle slightly greater than 90 degree.
3. **Lithotomy positon :-** This is the most preffered position for examination in Ano-rectal disorders. Detailed information refarding pelvic viscera can be obtained and bi-manual examination can be performd properly in this position.

4. **Knee-elbow position :-** This position is particularly suitable for palpating the prostate and seminal vesicle.

5. **Supine position :-** (Dorsal position) :- Patient lies on his back with hips flexed. it is convenient for ill patient and to do bi-manual examination.

6. **Righty lateral position :-** It can be chosen in the case of carcinoma at pelvi-rectal junction.

Physical Examination :-

It includes general survey, local examination, and general examination. Ashtavidha pariksha and Dasvidha pariksha is to be accomplished to do the general assessment of disease and diseased.

Ashtavidhapariksha :-

1. **Nadi :-** Pulse (rate, rhythm, volume, pressure, character)

2. **Mutra :-** (Complete examination of urine)

Quantity of urine - increased in case of DM, diabetes inspidious. Decreased in case of renal failureor retention of urine, dehydration, fluid loss as in case of intestinal obstruction.

Color of urine :- Red in case of porphyria, black in case of alkeptonuriam, tubid in case of prostatitis and albuminuria, yellow in case of jaundice. Pus in urine in case of pyonephrosis, blood in case of cystitis or stone.

3. **Mala :-** (Complete examination of stool)

White color of stool in case of obstructed jaundice, Steatorrhoea in case in malabsorption syndrome and pancreatitis, blood in stool due to any local ano-rectal pathlogy, black colour of stool-melaena dueto upper GI bleeding, Pipe stem stool in case of anal stricture, toothpaste stool in case of Hirschsprung's disease.

Odour :- In case of jaundice is very offensive. Stool in case of amoebic dysentery smells like semen.

4. **Jiwha :-** (Observation from tongue examination)

Inability to protrude tongue (ankyoglossia) in infants due to tongue tie and in elderly in case of malignancy of tongue. Fasiculation is found in tongue in case of lesion of hyoglossal nerve or its nucleus.

Large tongue (macroglossia) sound in case of acromegaly, myxoedema. Amyloidosis. Color-pale in severe anaemia, yellow in case of jaundice. Tip of the tongue is blue in case of central cyanosis.

Moistness of the tongue decreased in case of dehydration.

Generalised atrophy of the tongue as ranula, sublingual dermoid cyst. Hairy leucoplakia in HIV, strawberry tongue is scarlet fever.

5. **Shabda - Obsevation of Crepitus & auscultation :-**

Crepitus means gratng & creackling sensation. It may be due to bone and joint patholgy or may be due to pathology in subcutaneous tissue. Bony crepitus in fracture, in joints it is heard in case of OA and other joint pathology. In case of surgical emphysema and gas gangrene, crackling sensation is felt by finger. Chest auscultation & abdominal auscultation (Hyperperistalsis & absence of bowel sound).

6. **Drik - Examination concerning Eyes**

Jaundice - Sclera of eyeball is yellow and it is pale in severe anaemia. Red eye is found in conjunctivitis, keratitis etc. Black eye due to trauma to eye. Unequal pupils (anisocoria) in Horner's syndrome.

7. **Sparsha :-** Examination concerning Skin.

Touch of the patient is felt moist in case of hypothyroidism and dry in dehydration. Skin of the patient is thickened, greasy and loose in acromegaly.

8. **Aakriti - Built and Attitude**
   - Nutritional status
   - Attitude - Posture
   - Decubitus - Position in bed

Atura Bala Pramana (Dash-vidha pariksha)

1. **Prakriti :-**
   - **Manas :-** satvik/rajas/tamas.
   - **Sharirik** - V/P/K/VP/KV/PK/Tridosaja.
2. **Vikriti :-** Lakshana nimmita/lakshya nimmita/nimmit anurupa.
3. **Saar** - Twak/rakta/mamsa/meda/asthi/majja/meda/shukra.
4. **Samhanan** - Suksham/madhyama/heen.
5. **Pramana :-**
6. **Saatmya** - Ekrasa/ madhyarasa/sarvarasa/sheeta/usna.
7. **Satva** - Pravara/Madhyam/Avar.
8. **Aahar shakti :-**
   - **Abhyran shakti** - Pravara/Madhyam/Heen.
   - **Jaaran skakti** - Pravara/Madhyam/Heen.
9. **Vyayam shakti** - Pravara/Madhyam/Heen.
10. **Vaya** - Bal/Madhyam/Vridha.

General examination :- Head to toe examination is done under this heading.

Head and Neck :- Eyes, mouth, pharynx, movement of neck-veins, lymph node, carotid pulse, cranial nerve examination is done.

Upper limb :- General examination of the arms and hand with particular reference to vascular supply and nerve supply is done. Power, tone, reflexes and sensations is done. Lymph node and finger nails for clubbing and cyanosis are examined.

Thorax :- Shape and size of chest, presence of any dilated vessles and pulsation, postition of trachea, apex beat, lung and heart (inspection, palpation, percussion, auscultation)

Abdomen :- Abdominal well (scar, dilated vessels, position of umbilicus), abdominal reflexes, visible peri-stalsis), palpation, percussion, auscultation, hernial orificies, genitalia, inguinal glands.

Lower limb :- General examinationj of leg and feet (vascular supply, nerve supply), varicose veins, oedema, jonits.

Examination of External Genitalia :- For STDs,tumors & other related conditions..

Local Examination :-

Inspection :- It is the most important part of examiation. Some ano-rectal diseases can be diagnosed by inspection only as pilo-nidal sinus, condyloma, anal canal, fistula in ano. sentinal pile, anal tags etc.

Palpation :- It should be performd before DRE.

As a tender and indurated swelling with brawny edema on one side is due to ischio-rectal abscess.

Palpation of the perianal region :- Done with un-lubricated finger. Any suspected abscess or haematoma should be palpated for tenderness. In case of any extenal opening distance from that to anus is palpated for any kind of induration of fistulous tract.

Palpation of anal canal and rectum :-

Digital rectal examination :- For this patient is told about position and procedure and instructed to breath in and out with mouth open. Pulp of gloved and lubricated finger should be placed flat on anal verge and gentle pressure is exerted till the sphincter yield. More pressure will gradually push the finger into anal canal with rotatory movement. Note tone of sphincter, any pain tenderness and any thickening of the wall of anal canal. When finger enters into rectum, it should be pushed as high as possible and examination can be divided into

(a) With in the lumen (b) In the wall (c) Outside the wall

(a) **With in the lumen :-** Hard stool, apex of intussusception may occasionlly be falt. In intestinal obstruction there is ballooning of the rectum. If a mass can be felt ask the patient to strain down.

(b) **In the Wall :-** Just inside the opening of the anus a circular groove between external and internal sphinteric muscle can be felt. Between these, internal opening of fistula in ano is usually felt. 3 cms form the anal verge, ano-rectal ring can be felt. Position of different abscess an fistula can be determined with this. Above this the finger enters into rectum and valve of Houston is felt. Chronically inflamed and thrombosed pile mass can also be felt but uncomplicated pile mass can only be diagnosed by proctoscopy. Ulcer is diagnosed as loss of normal smoothness. Polypus of rectum can be felt as a soft round growth slipping under finger. Any narrowing of the lumen can be felt and is sign of stricture. Carcinoma of rectum usually occur in lower part of ampulla where they tend to be appear as papilliferous or ulcerative lesion with everted edges. Some lesions also occur in upper part of rectum and are particularly of annular variety.

(c) **Outside the wall :-** In the anterior rectal wall in case of men, prostate and seminal vesicle are easily felt. In females, cervix and retroverted body of uterus is palpated. Through the rectal wall in the recto-vesical , recto-uterine pouch other structure such as tumour of upper rectum and pelvic colon, hard faecal mass etc can be palpated. Posteriolry sacrum and coccyx should be palpeted for any condylomata and sacroccygeal teratoma and post anal dermoid. Laterally both ischio-rectal fossa, lateral wall of pelvis, lower end of the ureters, internal iliac arteries. Pelvic appendix can also be felt on right side.

Examination of the examining finger on withdrawl :- If blood, mucous or pus is observed, it suggests presence of any ulcer, growth or colitis.

A vaginal examinaton is often required to supplement rectal palpation as in case of rectovaginal fistula and in local spread of carcinoma in posterior vaginal wall.

Bi-digital examinaton :- In case of perianal abscess an ischio-rectal abscess swelling is tender and indurated and is better felt by bi-digital examination. For this tip of index finger is inserted into anal canal and thumb is put out side the anal verge to feel the extent of swelling, cord of the fistulous tract. It gives better assessment.

Special Investigations :-

Routine bood investigations :- Strandard Approach is taken.

Proctocopy :- Visual examintion of the lower part of rectum and anal canal through proctoscope is done. A lubricated proctoscope is inserted into the anal canal in upwards and forwards direction towards the umbilicus of the patient and them backwards along the hollow of sacrum in rectum. Patient is asked to breathe in and out. Obturator is taken out when it is fully introduced. Inside of the proctoscope should be well illuminated. Firstly, the mucous membrance of the rectum is examined for any kind of inflammation, ulceration or new growth, Now proctoscope is slighty withdrawn and anal mucosa will be seen as protruding through proctoscope. Now number and postition of internal haemorrhoids should be looked for.

Sigmoidoscopy :- It is about 14 inches in lenght and used to see inside of the lower part of pelvic colon and whole of rectum. A well lubricated sigmoidoscope is inserted into anal canal. After ano-rectal junction is reached further advancement should be done under direct supervision. Obturator is withdrawn and carrier of light and bellows are fitted. Further horizontal force is encountered in recutm and then pushed along the sacral curve. When half of he rectum is crossed, it is pushed slightly anteriorly to reach upper part of rectum. Further , sigmoidoscope is inserted under direct supervision and with gentle inflation of bowel.

Any growth in lumen, mucosa of recum, ulcers can be seen. Biopsy can also be taken with the help of long forceps.

Ano rectal manometry :- It measures the resting anal pressure generated by the sphincter complex of anus. It can define hypo or hyper functional disorders of the sphincter complex. This test measures the pressures of the anal sphincter muscles, the senstaion in the rectum, and the neural reflexs that are needed for normal bowel movements. Normal resting pressure ranges from 40-80 cm of water coloumn, whereas squeeze pressure ranges form 80 to 160 cm of water coloumn.

Indication :-

- Faecal incontinence
- Constipation
- Pre/post surgical evaluation
- Functional ano-rectal pain
- Pelvic floor dyssynergia
- Hirschsprungs' disease

Anal Sphincter EMG :- Anal sphincter electromyography (EMG) is recorded with a small plug electrode placed in the anal canal. The patient then is asked to relax, squeeze and push at differnet times. The anal sphincter muscle electrical activeity is recorded and displayed on a computer screen. Anal sphincter EMG confirms the proper muscle contractions during squeezing and muscle relaxation during pushing. In people who paradoxically contract the sphincter and pelvic floor muscles, the tracing of electric activity increases, instead of decreasing, during bearing down to simulate a bowel movement (deafection).

Normal anal EMG activity with low anal squeeze presures on manometry may indicate a torn sphincter muscle that requires sugical repair.

Endo Anal Ultrasonography :- It is a safe, well tolerated, easy to perfrom procedure which provide best visualization of anal musculature and perianal structures. The anal structures appear as concentricrings. Internal anal sphincter appears as dark ring and external sphincter as mixed echogenic or gray ring. Puborectalis muscle appears as external sphincter but is "U" shaped because it has no anterior component.

Defects in the sphincter muscles are recognised by breaks in the muscular rings. Anal masses could also be identified readily as cyst, lymph node, abscess.

Ballon Expulsion Test :- For this procedure, a small ballon is inserted into the rectum and then inflated with water. The patient goes to the bathroom and tries to deafecate (expel) the small ballon from the rectum.

The amount of time it takes to expel the balloon is recorded. Prolonged balloon expulsion suggests a dysfuntion in the ano rectal area.

Defecography :- It is important in evaluation of chronic constipation and measures individual's ability to evacuate radiographically and presence or absence of a rectocele or internal intussception.

Radiological Investigations :-

1. **Striaght x-ray of the abdomen :-** To see the signs of interstinal obstruction due to annular growth at recto-sigmoid junction.
2. **Chest x-ray -** To exclude pulmonary metastasis in case of rectal CA.
3. **Barium enema x-ray -** In case of any internal haemorrhoids, barium enema must be performed to exclude rectal CA as a cause of bleeding per anum. It also reveals rectal polyp, ulcerative colitis and crohn's disease.

   Through Double contrast barium enema rectal and colonic pathologies could be detected easily than barium enema x-ray.
4. **CT Scan and Ultrasonography -** To see the metastasis in nearby visceras in case of rectal CA and pelvic and intra abdominal lymph nodes.
5. **MRI and fistulogram -** To defined presence and cause of any secondary track.

Other investigations :-

1. **Examination of stool :-** Naked eye examination - For presence of mucus, blood etc.

Occult blood examination - In case of carcinoma intestine.

Bacteriological and ova cyst - In dysentery.

2. Bacteriological examination of pus or tissue from infected wound
3. **Cytological examination -** Colonic lavage is done with normal saline through sigmoidoscope. Evacuated fluid is sent for cytological examination.
4. **Blood wassermann reaction :-** In case of suspected syphilitic lesion.
5. **Frei's test -** 0.1 ml of sterile pus obtained from un-ruptured bubo of a patient is injected intradermally. if red papule of atleast 6 mm appear in 48 hours then the test is positive for Lymphogranuloma inguinale.
6. **Compliment fixation test :-** For lymphogranuloma venereum.

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Chapter - 9

Application of Kshara Sootra in Benign Growths

Introduction :-

Etymology :-

Benignare	(L) Means mild, not recurrent or progressive
Neoes	(G) Means new, something new
Plasma	(L) form, mold
Plasma	(G) anything formed

Thus, benign neoplasm is a new growth having fibrous capusle, limited potential for growth and regular shape and cells that are well differetiated. It does not invade surrounding tissue or metastasize to distant site or sites. Some of the benign neoplasms are adenoma, fibroma, haemangioma and lipoma.

Benign growths are the most common occurring swelling in the body. They are often symptomatic, but causes panic to patient as they think of it as fetal cancerous growth. This mental impression for the benign growth as cancer compels them to visit the surgeon. Some other go for cosmetic reasons.

In modern surgery, these benign growths are treated by means of simple excision.

Here these benign growths are dealt using minimum invasive para-surigical Kshara Sootra technique. This technique not only cures the problem but also check its chances of reoccurrences.

Management of Benign growth by kshara sootra karma.

Requirements :-

The equipments required for conduction the procedure are as under :-

1. Operation table
2. Spot light
3. Sponge holding froceps
4. Anal speculum
5. Artery forceps
6. Round body curved needle
7. Needle holder
8. Round body needle.
9. Allies tissue forceps
10. Scissors
11. Surgical blades.
12. Local anesthetic agents :-
    2% lignocaine with adrenaline,
    2% lignocaine.
13. Disposable syringes.
14. Torch
15. Lubricants
16. Surgical gloves
17. Apamarga Kshara Sootra
18. Sterile gauge
19. Bowels
20. Sterile cotton bandage.
21. Sterile pads.

Technique of kshara sootra karma in management of benign growth (Rectal Polyp)

Rectal polyps are tissue growths that arise fromwall of rectum and protrudes into it. They may be benign or malignant.

Poorva karma (preoperative measures) :-

- The patient is given prophylaxis against Tetanus i.e. 0.5 ml of tetanus toxoid.
- Sensitivity is done using 2% lignocaine solution by intradermal injection.
- Soap water enema can be given half an hour before the procedure for proper cleansing of the rectum in case of rectal polyp.
- The patient experiencing excessive anxiety can be administered an mild anxiolytic drug night before the procedure.
- The patient is kept nil orally for 3-4 hours before the procedure.

Pradhana karma :-

Type of anaesthesia :-

Local anaesthesia or general anaesthesia can be used as per requirement.

Haemorrhoidal block :-

1% Lidocaine with adrenaline Hcl is given in the dose of 7 mg/kg body weight in fan shaped manner about 1 cm below and above the anal orifice in midline using 21 G needle.

Transcuataneous pudendal nerve block :-

The ischial tuberosity is taken as the landmark ot perform transcuatenous pudendal nerve block. The tuberosity is palpated subcutaneously through the buttock and 7.5 gm long needle (21G) is introducedinto the pudendal canal along the medial side of the tuberosity. The pudendal canal lies about 1 inch (2.5 cm) deep to the free surface of the ischial tuberosity. The local anesthetic 5 ml of 1% is then infiltrated around each side of the pudendal nerve in both sides.

Digital rectal examination is performed once again to exclude any specific pathology. The proctosigmoidoscopy is also carried out if required.

Intra canal packing is given to avoid soiling during operation.

Digital anal dilatation (stretching of the anal sphincters) - A procedure similar to that described by Recamier (1829), is done instead of Lord's procedure. This procedure is done for better visualization of the rectal polyp.

Recamier's digital anal dilatation Technique :-

With the patient in lithotomy position, the anus is forcibly stretched by introducing first both index figures and then index and middle fingers of both hands, which maintain a firm traction for three or four minutes. During this manoeuvere the forearms are fully pronated so as to stretch particularly the posterior wall of the anal canal. Often a better stretch is obtained in male patients by using the saggital rather than the transverse plane as this avoids the fingers coming in contact with the ischial tuberosities. The problem does not arise in women, owing to wider pelvis.

Procedure :-

Step - I Revelation of the rectla polyp or benign growth :-

During digital examination the rectal polyps will be palpated and bent finger will be helpful to bring the polyp out the canal. After digital dilatation, the lubricated proctoscope is inserted into anal canal slowly and the rectal polyp get prolapsed into the proctoscope. The position of the polyp is noted.

Step - II Holding of the rectal polyp or benign growth :-

After visualizing the rectal polyp carefully, the body of the rectal polyp is held with the help of babcocks tissue forceps with slight traction. The traction of polyp should not be huge otherwise it may torn subsequently leading to profuse bleeding.

Step - III Transfixation of the pedicle of polyp or benign growth :-

After holding the rectal polyp or benign growth, the pedicle is transfixed using Kshara sootra taken on a round body needle. There are many ways for transfixation of pedunculated benign growths. Some of them are mentioned below.

- This type of transfixation is particularly useful in cases of benign growths where the pedicle is broad. The transfixation of the pedicle of th e pedunculated benign growth is done with the help of ligature on two needles.
- The first needle is pierced through the base of the pedicle at a distance 1/3rd from one end. The same needle is again passed through the same point form the other side.
- In the same way, the second needle is also pierced through the base of the pedicle at a distance of 1/3rd from the othre end and again passed through the same point from the other side.
- Now ligature is cut proximal to the needles. The free ends of the ligature are now secured, two at either side and one in the middle.
- The advantage of this type of ligature is that none of the blood vessels is spared from ligation.

Alternatively, transfixation in the form of '8' figure can be done by passing the needle through the pedicle of the ligature from one side and then again piercing the needle through the same point from the other side. The needle is cut and the free ends of the ligature are secured and ligatured.

Besides, the transfixation in the form of horizontal mattress can also be done by passing the needle through one end of the pedicle of the benign growth. Subsequently the needle is then passed through the other side of the pedicle from the other end. The ligature is cut proximal to the needle and free margins which cross each other are ligatured.

Management of Rectal Polyp by Apamarg Kshara Sootra

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Management of Papiloma by Using Apamarga Kshara Sootra

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Transfixation of pedicle of benign growth

↓

Ligation of pedicle of papiloma

↓

Management of Wart by Kshara Sootra Karma

Step - IV Ligation of the pedicle of the polyp or benign growth :-

After proper transfixation of the pedicel of the benign growth, the free ends of the Kshara sootra are ligatured. the Kshara Sootra above the knot is cut leaving 2-3 mm above it. This is done in order toreduce the action of Kshara sootra over the surrounding rectal mucosa. If the redundant part of thte benign growth is large, then it can be excised.

Consequently sterile gauge piece soaked with Jatayadi taila is placed inside the anal canal to safeguard from corrosive action of extra Kshara and further aid in wound healing thereafter. T- Bandage is applied to secure dressing in position.

Paschata Karma :-

- Patient is kept nil orally for 3 hours.
- NSAIDs may be prescribed as per need.
- Regular monitoring for hemorrhage is done without disturbing the anal dressing.

Post operative care and prescription :-

- Dressing is removed next morning after the Ushnodaka avaghana.
- Instillation of Jatayadi taila into the anal canal with the help of

No. 6 Rubber catheter attached with a 5ml of syringe.

Triphala guggula	-	2 tablets x BD
Amalaki churna	-	5 grams x BD

Complication :-

- **Excessive inflammation** - It can be treated by using suitable broad spectrum antibiotic and NSAIDs drugs.
- **Pain** - Mild analgesics may be administered.

Diet :-

Light bland diet, leafy vegetables, milk, cream, curd, lassi etc. Plenty of water orally.

गात्रप्रदेशे क्वचिदेव दोषाः सम्मूर्च्छिता मांसमधिप्रदूष्य वृत्तं स्थिरंमन्दरूज महान्तमनल्पमूल चिरवृद्ध्यपाकम् कुर्वन्ति मांसोपचयं तु शोफं तदर्बुदं शास्त्रविदो वदन्ति।। (सु. नि. 11/13-14)

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Chapter - 10
Application of Kshara Sootra in Haemorrhoids

Introduction :-

Sushruta, the father of Indian surgery has found Arsha as very troublesome disease for treatment, therefore he mentioned it as one of the eight mahagadas.

Vachaspatyam, described word 'Arsha' derived rom the root "ऋगतौ" with suffix Asun having agama 'shut' in the formation of word meaning a disease having fleshy sprouts or shoots in the pudendum.

Charak explains that Arsha is an abnormal fleshy growth in anorectal region where as in othe sites it is called as adhimansa, for example, in nasa karna, etc.

Vagbhatta also defines arsha in a similar manner saying that when muscle like fleshy projection behave like an enemy and create obstruction in guda marga, they are called as Arsha.,

Based on the semeiography observed in raktarsh i.e. Proctorrhagia & prolapse, it can be co-related with Haemorrhoids.

Haemorrhoids has affected human civilization for centuries and is certainly one of the commonest elements that afflict human kind.

By common consent, the terms 'haemorrhoids' and 'piles' are used quite inter changeably, but etymolgically the word have entirely different meaning.

The term 'haemorrhoids' is derived form the Greek adjective 'haemprrhoids meaning bleeding (haima-blood, rhoos-flow) and emphasized the most prominent symptom of the disease in the majority of cases. The term, 'pile' on the other hand, is derived from latin word ' pila' meaning a ball.

Synonyms :-

(i)	Payu roga	-	Meaning disease of anus.
(ii)	Durnama of durnamakam	-	Meaning bed or difficult to name or a bad one by name.
(iii)	Guda keela	-	Meaning of tag in anus
(iv)	Anamakam	-	Meaning infamous or the one which gives pain to life.
(v)	Gudankur	-	Meaning a spout or swelling in the anus.
(vi)	Gudaya	-	Meaning born or arising form guda.

Thus all synonyms show that the word Arsha pertains to a disease occurring in guda or anorectal region. It is torturing to the patient and it may create hindrance in the function of ano rectal region.

Classification of Arsha :-

According ot aetiology :-

- Sahaj
- Uttarkalaja

According to clinical Observations :-

- Shuska (Dry)
- Ardra (wet)

According to dosha :-

- Vataja
- Pittaja
- Kaphaja
- Sannipataja
- Raktaj
- Dwandaja

According of the site of origin :-

- Bahaya (bahaya vali)
- Madhyam (madhyam vali)
- Abhyantar (antarvali)

According to therapeutic methods :-

1. Bheshaja sadhya
2. Kshara sadhya
3. Agni sadhya
4. Shastra sadhya

According to prognosis :-

1. Sadhya
2. Kastha sadhya
3. Yapya
4. Asadhya

Proverb given by John of Arderne, 1st English Surgeon :-

The common people call them piles, aristocracy call them haemorrhoidesm, French call them figs, What does it matter is long as you can cure them.

Definition :-

Piles are defined as the varicose condition of the intenal haemorrhoidal plexus (which is above the pectinate line)

OR

These are dilated veins within the anal canal in the sub-epithelial region formed by radicles of the superior, middle and inferior rectal veins.

It is impossible to give an accurate figure of the prevalence of haemorrhoids. Although many patients present with symptomatic disease, many do not and some never have symptoms. Certainly vascular cushions within anal canal do not differ anatomically in normal individuals from those in symptomatic patients.

Burkitt (1972) has stated that haemorrhoids are rare in rural Africa an contrast to this with the much higher incidence of anal symptoms in balcks in the USA and in urban Africa. Haemorrhoidal disease is also prevalent in the elderly, especially over 50 years of age. Due to repid urbanization globally and increasing lifeexpectancy, haemorrhoids has emerged as a significant health probelm affecting around 50 % of population over the age of 50 years.

Haemorrhoids present with a distressing symptoms complex of pain, painless bleeding, prolapse, discharge, irritation and symptoms of secondary anaemia. It can even present as an emergency if complication like thrombosis, strangulation, ulceration, infection, gangrene or portal pyaemia occurs. However, diagnosis of haemorrhoids is usually readily established by careful consideration of the history combined with examination especially by proctoscopy.

Aetiology :-

(i) Idiopathic causes. (ii) Secondary causes

Idiopathic Causes :-

(a) **Hereditary** - It is often seen in members of the same family.

(b) **Anatomical** -

(i) Absence of valves in superior haemorrhoidal veins.

(ii) The veins pass through the rectal musculature, 10 cm above the anus, will cause occlusion of the vein and congestion during defecation.

(iii) The radicals of superior rectal vein lie unsupported in loose submucous connective tissue of the rectum.

(c) **Exciting causes :-**

(i) Straining to expel constipated stool csaused dilatation of the venous plexus.

(ii) Diarrhoea and dysentery.

(iii) Enteritis

(d) **Physiological causes :-**

Hyperplasia of the corpus cavernosum rectum, may from failure of mechanism controlling the arterio-venous shunts producting superior haemorrhoidal veins varicosity and haemorrhoids.

(e) **Diet :-** Low roughage western diet may excite haemorrhoids formation.

II. **Secondary causes :-**

(i) **Carcinoma of rectum** - Compresses on the superior rectal vein and give rise to haemorrhoids.

(ii) **Pregnancy** - Compress superior rectal vein as also causes secondary laxity in smooth muscles of the veins.

(iii) **Difficulty in micturation** - Stricture of urethra or enlarged prostate will cause increase intra abdominal pressure and will raise the venous pressure in the superior haemorrhoidal veins to cause haemorrhoids.

(iv) **Portal hypertension** - The superior haemorrhoidal vein is tributary to the portal venous system so portal obstruction due to any cause can cause haemorrhoids.

Classification :-

Classification in relation to pathological anatomy

(i) Primary haemorrhoids (ii) Secondary haemorrhoids

I. **Primary haemorrhoids :-**

These are 3 in number seen at 3,7 and 11 O'clock position. The rectal artery which divides in to right and left main branches the left brach continues as a singel vessel and terminate at 3 0' clock, where as the right branch divide in two branches, one terminates at 11 O' clock and other terminate at 7 O' clock.

II. **Secondary haemorrhoids :-**

Presence of additional haemorrhoids in between the primary piles are known as the secondary piles.

Degree of haemorrhoids :-

(i) First degree haemorrhoids

(ii) Second degree haemorrhoids

(iii) Third degree haemorrhoids

(iv) Fourth degree haemorrhoids

(i) **First degree haemorrhoids :-**

The presentin feature is bleeding per anum in the form of splashes or drops. No history of any typeof prolapse is there.

(ii) **Second degree haemorrhoids :-**

Haemorrhoids comes out only during defecation and get reduced spontaneously after defecation.

(iii) **Third degree haemorrhoids :-**

Hemorrhoids comes out only during defaecation and do not return by themselves, but need to be replaced digitall and then they stay reduced.

(iv) **Fourth degree haemorrhoids :-**

The haemorrhoids are permanently prolapsed at this stage. Great discomfort is complained of with a feeling of heaviness in the rectum.

Clinical Featurs :-

Bleeding :-

It is bright red, painless and occurs along with defaecation. The patient complains that it splashes in the pan as the stool comes out and may continue for months or even year.

Prolapse :-

It is a later symptom, patient may complaint of a protruding mass on straining while defecation and the mass disappears spontaneously after the act is over whereas in long standing cases the mass does not reduce spontaneously but has to be reduced digitaly into the anal canal.

Pain :-

It is not characterstic of haemorrhoids unless there is associated complications like thrombosiss /strangulation/ulceration/infection/ or fisssure in ano etc.

Mucous discharge :-

It is particular symptom of prolapased haemorrhoids. Theis mucous discharge is due to engorged mucous membrane. Pruritis ani may be caused by such mucous discharge.

Anaemia :-

It is often seen in the long standing cases of haemorrhoids due to persistent and profuse bleeding.

Examination :-

On inspection :-

Internal haemorrhoids without prolapse may not show any abnormal feature. IInd and IIIrd degree internal haemorrhoids may be seen only when patients strains and that too transiently and the prolapse disappears after the straining is over.

Digital examination :-

Cannot feel an uncomplicated internal pile unless it is thrombosed.

Proctoscopy :-

It will reveal the internal piles. The proctoscope is introduced as far as it does. The obturator is then removed and with an illuminator the inside of the anal canal in visualized. The proctoscope is now withdrawn slowely and the internal haemorrhoids will be seen bulging into the proctoscope.

Complications :-

Bleeding :-

Particularly in the first degree and early stage of the second degree. A patient with first degree haemorrhoids for quite a long time will become anaemic. Bleeding usually occurs externally. Only when a bleeding haemorrhoids is retracted, it may bleed internally into the rectum.

Thrombosis :-

The thrombosed haemorrhoids become dark purple or balck and feel solid. The anal margin become oedematus and there is severe anal pain. Pain may continue for a week or so until the oedema subsides and the thrombosis is observed.

Strangulation :-

Second degree haemorrhoids are more often affected by this condition. When the internal haemorrhoids get prolapsed and become gripped by the external sphincter, further congestion occurs as the venous return becomes impeded leading to the strangulation.

Gangrene :-

Only occurs when the arterial supply of the haemorrhoids is somehow or by other way constricted, then sloughing occurs which is usually superficial.

Fibrosis :-

Usually follow thrombosis of the internal haemorrhoids. It also follow transient strangulation. Fibrosis of extenal haemorrhoids is much more common than that of an internal haemorrhoids.

Suppuration :-

Only occurs as a result of infection of thrombosed haemorrhoids. Throbbing pain with perianal swelling occur. Perianal or submucous abscess may follow.

Pylephlebitis (Portal Pyaemia) :-

This usually follows infection and suppuration of the haemorrhoids, which ultimately causes portal pyaemia and liver abscess.

Differential diagnosis :-

External Piles :- Bluish colour of the anal skin due to underlying veins an verices.

On straining, engorged external marginal veins, causing many soft swellings around anal margins, which disappears after straining/by gentle pressure.

Anal epithelioma :- It is rare condition. it gives pebbled appearance. Swelling is firm and nodular. Diagnosis in confirmed by biopsy.

Condyloma latum :- It is secondary lesion of syphilis. Appearance of small flat topped wart lie growth.

Condyloma acuminata :- Lesions are multiple. Cauli-flower like appearance and are pointed. It secretes excess moisture with irritation and unpleaseant odour.

Sentinel Tag :- It always accompanies anal fissure.

Internal Piles :-

Hypertrophied anal papilla :- A frim mass, arising from a pedicle in the region of dentate line.

Pedunculated polyps :- Arises from mucosal lining of rectum. It is painless condition.

Sessile, polypoid (Adenomatous) :- Are ture carcinomas. Easily palpted. Biopsy confirms the diagnosis.

Haemangioma and Lymphosarcoma :- Mucosa is coarsely pebbled, but intact easily traumatized.

Prolapse :- Partial rectal prolapse affects either a part or whole of the circumference of anal outlet. The prolapsed portion is composed of longitudinal folds. Complete rectal prolapse is characterized by concentrically arranged mucosal folds.

All these afore said facts have encouraged researchers throughout the world to come up with various forms of treatment for haemorrhoids. Various treatment modalities available for haemorrhoids include operative as well as non-operative methods. Non-operative methods including medicinal treatment, sclerotherapy, cryosurgery, rubber band ligation, manual dilatation, infrared coagulation, biopolar coagulation, direct coagulation, laser coagulation.

Operative treatments of haemorrhoids include formal haemorrhoidectomy by different methods like high ligation and excision (miligan morgan type), low ligation and excision (miles operation), submucosal haemorrhoidectomy, closed haemorrhoidectomy, circumferential excision of entire pile bearing area with suture (white head operation), stapled haemorrhoidectomy etc.

Treatment :-

Non Pharmacotherapy :-

Aahar	-	Langhan, Moongdal soup, deepan, pachana, vatanulomana ausadh.
Vihara	-	Avagaha, dhupana, vasti, swedana, abhyanga.

Pharmacothetrapy :-

Phytotherapy :-

General - Kutaja (Holarrhena antidysentrica), bilva (Aegle marmelos), chitraka (plumbago zeylanica), haritaki (Terminalia chebula), shunthi (Zinziber officinale), ativisha (Aconitum heterophylum), yavasa (fagonia cretic), Daruharidr (Berberis aristata), Vacha (Acorus calamus), Chavya (Piper retrofractum) etc.

Local :- Iepa of Shuhi ksheera with haridra

Chemotherapeutic drugs :-

Treat the patient for anaemia by haematinics. Blood transfusion may be necessary in severe cases of anaemia. The constipation may be treated by laxaive and suitable coagulants may be used. The flavonoids as Diosmin, clacium dobesilate are also useful to tone up the vessels.

Local :- It should be ascertained, whether the piles are primary or seconday. Idiopathic or primary piles require treatment.

In 1st degree haemorrhoids local application of medicated oil or astringent ointment is tries. Ointment containing calcium dobesilate, policresulen etc. and can be used locally.

Parasurgical :-

Palliative :- Ksharakarma, injection therapy bio blood letting barron's band ligation agni-karma(cautrization LASER - Coagulation, cryosurgery, lord's procedure.

Curative - Kshara sootra karma

Surgical - Haemorrhoidectomy

Injection therapy :-

Sclerosant injection (5% phenol in alomond oil) has been the mehtod of treatment of small vascular haemorrhoids and indeed is used to control all cases of 1st degree haemorrhoids.

Rubber band ligation :-

Rubber banding is the ideal method of treatment of treating large Ist degree and second degree interanl haemorrhoids in absence of associated tags or external haemorrhoidal component.

Equipment and technique of rubber band ligation :-

Equipment :-

The original Barron Ligator 26, 30 comprises a long shaft that can be introduced through a proctoscope. It contains within it a rod which activates the inner of the two concentric drums at the working end of the instrument.

Proximally there is a handle which is squeezed to advance the outer drum so as to release the rubber ring. The rubber O-rings are 2-3 mm in diameter and are small sections of black rubber tubing.

The ruuber bands are stretched over a loading cone from which they are pushed on to the 11 mm inner drum of the instrument. Better strangulation of the mucosa appears to occur if two bands are used rather than one. The shafts and drums of the instrument are interchangeable so that a number of shafts can be prepared in advance and interchanged on to the same handel. Alternatively rubber bands can be reloaded on to the same instrument. This reloading procedure may not be aesthetically desirable if the cylinder becomes contaminated with faeces.

Technique :-

Pre-operative Work up :-

(i) Written informed consent of the patient and attendant should be taken.

(ii) Anti-tetanus prophylaxis should be given.

(iii) No special bowel preparation is required.However, if on perliminary anoscopic examination, rectum is found loaded, proctoclysis enema shoud be given.

Operation Steps :-

(i) Position : Barron's band ligation is done with patient in left lateral position.

(ii) An assistant is required to hold the handle of the proctoscope.

(iii) The inside of proctoscope is illuminated by in built or external light source.

Technique of application :-

The proctoscope is passed through the anal canal into the rectum. The haemorrhoidal masses are identified, if necessary, by asking the patient to strain a little. The barron's ligator is introduced through the anoscope and brought to near on the mucosal part of the most prominentpile. The long alligator forceps (or a long pair of alli's tissue forceps) are next passed through the proctoscope and through the drum while the distal end of the durm is firmly pressed against the anal canal wall, special care being taken to see that its interior edge was at least 1 cm above the pectinate line.

If at this point, patient complains of pain or discomfort, the mucosa should be set free and grasped again a litttle higher up away from pectinate line by closing the handle of the ligator, the rubber ring is pushed off the drum and instantly closed on the base of the pile ; the resulting nub of strangulated tissue is about 1 cm. in diameter (about the size of a smell cherry).

Barron (1963)26 recommended only one ligation at each session followed by subsequent ligations at 3 weekly intervals. However, Bartizal and Slosberger (1977) 36.murrieet al (1980) 35. Cheng et al (1981) 37. Goligher (1984)1, Lee H.HJ (1994) 38 Khub Chandani 27, 39 have advocated multiple ligations at same sitting without any increase in complications. Multiple ligations are time saving and cost effective.

Post operative follow up :-

1. Rest for a few nimutes (15-20 minutes).
2. Patient should be advised not to strain to avoid slippage of Rubber Band.
3. Simple non narcotic analgesia (PCM) may be given if and when required, to over come mild pain, discomfort and foreign body senstion.

4. Bulk evacuant and light diet are prescribed till sloughing off of haemorrhoidal masses.
5. Patient are advised to report immediately in case of dysuria, retention urine, proctorrhagia, so that complicatins like reactionary or secondary haemorrhage and pelvic cellulitis could be excluded.

Cryo Surgery :-

The new form of cryotherapy involves freezing the tissues of haemorrhoids for a sufficient time to cause necrosis. It includes the application of liquid nitrogen at a temperature of minus 160 o C is used at the pedicales of the haemorrhoids for 3 min each.

Maximum anal dilatation (Lord's Procedure) :-

Maximal anal dilatation was introduced in an attempt to distupt this tight band. The whole of anal canal and lower rectum are slowely and uniformly dilated with the fingers until 3 fingers of both hand are inserted.

Operative treatment :-

Haemorrhoidectomy :-

Indication :-

- For large third deree haemorrhoids
- Fibrosed haemorrhoids
- Failure of conservative treatment of IInd degree haemorrhoids
- Interno external haemorrhoids

Types of Haemorrhoidectomy :-

- Ligature and excision method
- Closed haemorrhoidectomy
- Submucous haemorrhoidectomy (Park's)
- Circular stapled haemorrhoidectomy
- Endo -stapling technique

Haemorrhoidectomy is of 2 type mainly :-

1. Open haemorrhoidectomy
2. Closed haemorrhoidectomy

1. Open haemorrhoidectomy :- Position used for this is either lithotomy or jack-knife position. Proctoscope is inserted to identify site of three pile masses. Inj. Xylocaine with adrenaline (1 : 200,000) with saline is injected aroud skin adjacent to each haemorrhoid and in the lower part of intersphincteric space and in submucosal plane of haemorrhoids.

Pile mass and adjecent skin adjacent to haemorrhoid is holded with tissue forceps and grasped in left hand.A 'V' shaped incision is made on surrounding perianal skin. Cut is deepened down towards anal canal. Fibers of internal anal sphincter are swept away. They haemorrhoidal tissue is excised to leave the apex of haemorrhoid intact for ligature. It is enclosed in an arterial clip and transfixed using non absorbable suture material. Haemostasis is maintened by use of cautery. gauze dressing is then applied to each haemorrhoidal area.

Post Operative complication :-

1. Retention of urine
2. Reactionary and secondary haemorrhage
3. Portal pyaemia

Kshara-Karma therapy in the treatment of Arsha :-

The aim of ayurveda is to cure the disease of the diseased person and guard the health of haalthy person. The latter may be regarded as preventive or prophylactic measures. In the management of Arsha, the treatment can be classified into preventive and causative measures.

The general principle in prevention of all disease is to avoid such factors which are enumarated as causative factors in the development of any disease as already discussed. Mandagni or poor digestion and constipation may be regarded as principal factors. Therefore such maesures which keep the agni in improved state and bowels regular, would prevent development of Arsha. In addition other factors enumerated in the etiology responsible for the Arsha should also be avoided eg. Constipation, sedentary habit, excessive riding, undesirableposture, etc. Besides the person should follows the general instructions as described for each season, make the proper use of shodhana therapy and should not indulge in unhealthy habits. Even, sushruta has described four therapuetic measures in the treatment of Arash viz. Bheshaja, Kshara, Agni and Shastra karma.

Kshara is a caustic, alkaline in nature obtained from the medicinal plants. Kshara is a milder procedure compared to surgery and thermal cautery. It is capable of performing typical functions like, chedana, bhedana and lekhana and destroys the tridoshaj disease, it is versatile because even such place, which is difficult to approach by ordinary measure can be treated by this method.

Sushruta has indicated kshara karma in soft, spreaded out, deep rooted and elevated type of Arsha. According to doshic involvement, mild kshara should be used in pittaja and raktaja arsha and tikshana kshara in kaphaj and vataj arsha.

Kshara karma in Arsha can be performed with the help of Arsho yantra. In case of prolapsed rectum and big, prolapsed arsha, kshara should be applied without yantra.

Method :-

After introduction of arshoyantra, arsha are visualized, there after it should be pressed by cotton swab with the help of a measurable draivmukhi salaka. Kshara is to be applied through the opening of arshoyantra and should be covered by hand and wait until the counting of one hundred, then afterwards, kshara may be applied again taking in to consideraton, the strength of kshara and severity of disease. The application should be stopped when arsha begin to acquire colour of ripe jambu. The kshara should be washed out by sour fluid or jiice of citrus fruits. The pile mass should be emollified by ghrita mixed with madhuka and instrument sould be taken out. The pile masses should be treated one by one, at an internal of seven days each. In case of multiple piles, the right should be managed first and then the left one.

Method of submucosasl sclerotherapy with kshara :-

Poorva Karma :-

A day prior to injection mild laxative like Eranda-Bhrista Haritaki in the dose of 3 to 6 grams is given to clean the bowels and local shaving is also done. The patients is kept on fast over night and on theday of sclerotherapy procedure, a simple soap water enema is given to clean the colon, rectum and anal canal, in the morning on the day of the procedure.

Preparation of ksharodak :-

The powder Apamarga - Kshara 50mg. is dissolved in 3 ml of distilled water and again filtered through two layers of whatmann fine grade filter paper. Thereafter prepared Kshara solution is dissolved in the 6 ml almond oil as per requirement,. keeping in view the solubility and PH 10-11. Alternatively, 5% phenol in almond oil can be used for the purpose fo sclerotherapy.

Position :-

Lithotomy of Lt. lateral position the buttock elevated by sand bag at the edge of the table.

Equipments :-

The procedure is carried out without anaesthesia. The equipment required for conducting the procedure are as under :-

1.	Gabriel's type piles injection syringe.	2.	A long needle (used through proctoscope).
3.	Proctoscope.	4.	Sclerosant i.e. Kshara - solution.
5.	Almond oil	6.	Distilled water
7.	Cotton pellets.	8.	Gloves.
9.	Haemostat forceps	10.	Sponge holding forceps.
11.	Lubricant.	12.	Torch

The well lubricated proctoscope is introduced further in the anal canal & rectum and then obturator removed. Thereafter, the proctoscope is gradually withdrawn to display the pile mass in the lumen, for this purpose, the proctoscope during the withdrawl is manipulated in such a manner that the piles begins to prolapse into the open end of the proctoscope at the level just below the Anorectal Ring.

Using the Gabriel's syringe with the bevel of needle directed towards rectal wall, loaded with Kshara solution in alomond oil, the injection is made into submucosal plane at the base of each pile or just above the anorectal ring, the sufficient quantity, around 3 ml of the solution, should be injected to produce a fair swelling or elevation and pallor of the mucosa. The recognition of accurate injection is made by **Striation sign** ie. mucosal and sub mucosal vessels are seen radiating from the yellowish background of oil wheel.

The soluion spreads in the submucosa upwards to the pedicale and down words to the internal haemorrhoids and secondary haemorrhoids if present, but it is prevented by intermuscluar septum from reaching theexternal haemorrhoids. If there is only one haemorrhoids present, single infjection in first sitting is given with all precautions. If the piles at all three positions present, the injection is made in each pile in same session.

Further injections on three occasions are given at each at the interval of 3 weeks, if necessity is felt.

***Rule of "3" to* Remember :-**

1. 3 ml requried at each pile.
2. All three pile masses may be injected by turn in same session.
3. Maximum three sessions may be required.
4. Interval between each session is usually three weeks.

Precautions :-

1. At the time of injection reassurance is given to the patient that if any discomfort occurs, it will pass off. The discomfort will be minimized by lying down for an hour.
2. Care is taken not to give injection to prostate, anteriorly, for resulting prostatitis, can be crippling
3. Care should be taken neither to inject the mucosal layer nor muscular coat, as it may result in suppuration.
4. The injection in quantity of 3 ml is given slowly around the base of the pile above just at anorectal ring, if subsequent injections are required, the sclerosed mucosa will not usually take such a volume and to 1-3ml of Kshara Solution is only required below the initial injection site.
5. The patient is examined weekly after initial injection.

Post injection observation :-

- Although this injection is painless yet a dull ache is common for few hours. After giving the injection submucosally in pile mass, the patients feels some sort of discomfort and heaviness in teh anal canal. So, in order to combat it, reassurrance is sufficient that it will pass off.
- Secondly, the discomfort is minimized by lying down for few hours.
- Moreover, some apprehensive patient may need the use of mild analgesic whereas others, simple sitz bath is sufficient.
- Some patient may complain of mild pain in the abdomen, for which, hot water bottle fomentation is sufficient to help them.
- Burning sensation may also be observed in the patients during post injection period which is treated simply by sitz bath.
- All the patients are advised to take mild laxative viz Panch-skaar churan etc. right from the first day of injection, to regulate the bowel.
- Slight & transient bleeding from the point of puncture is noted which needs no specific treatment except pressure of few seconds which is applied for controlling haemorrhage transproctoscopically by cotton pellet held in haemostate.

Complications of procedure (Ksharodak - Sclero therapy)

1. Dull ache, usually nil if injection is made high up, pain indicates either too low or too deep injection.
2. Allergic manifestation.
3. Hepatic disturbance rarely by oil embolism.
4. Sub mucosal abscess and ulceration due to either intra-mucosal or excessive amount of drug.
5. Transient haemorrhage from injection site due to the puncture of some branch of superior haemorrhoidal artery. Usually, controlled by transporctoscopically, by direct pressure on the bleeding point by cotton pellet held in haemostate.
6. Occasionally, gangrene over injection site in the anal canal.
7. Genito-urinary complications may occur in Males patients and particularly when anterior pile mass has been injected. These compications are :- retention of urine, haematuria, prostatic abscess and very rarely urinary fistula in perineum.

Haematuria occur consequent upon the urethral damage while injection anterior pile whereas prostatic abscess the result of too deeper injection in antierior pile with superadded infection.

Advantges :-

1. Easy & O.P.D. procedure.
3. Relatively Painless.
4. Comparatively free from complications.
5. Suitable for the patients who are in extremely debilitating condition or unfit for surgery.
6. Parasurgical one and good for first & second degree internal piles even for 3rd degree piles and palliative measure.
7. Patients remain ambulatory.

Disadvantages :-

1. Faulty technique may lead to sloughing which is dangerous one viz prostatic abscess can be crip pling.
2. Arterial pile can not be dealt.
3. Infected piles can not be dealt.

Objective of injection therapy :-

It is to initiate chemical thrombosis and there by sclerosis of haemorrhoidal plexus leading to stoppage o bleeding . It also initiate fibrosis in submucosal plane, which fixes the loose redundant mucous membrane to th inner muscle-layer and draw up the pile mass hence check the prolapse.

Technique of Kshar Sootra Karma in haemorrhoids :-

Purva Karma including :-

1. Written informed consent of the patient and attendant.
2. Anti-tetanus prophylaxis
3. Xylocaine sensitivity test
4. Shaving of the operation field and soap water enema given 12 hours prior to operation.
5. Patients are to be kept nill orally for 12 hours before operation.
6. Another soap water enema is given in the morning of operating day. Either solution of polyethylen glycol with electrolyte (peglac solution) may be given one evening prior to operation.

Pradhana Karma :-

1. **Types of Anaesthesia :-**

(a) For an adult patient with average weight Sedation with Diazepam 10mg , I/V and pentazocine 15 30mg I/V slowly after securing I/V line.

(b) Haemorrhoidal block : 1% of Lignocaine with adrenaline is given in the dose of 6mg/kg bod weight in fan shaped directions about 1cm. below and above the anal orifice in midline, using 21 spinal needle.

Additional, pudendal block is given optionally, by injecting 10ml. of 1% lignocaine with adrenaline jus medial to right and left ischial tuberosities with a 7.5 cm. long needle (21G). Maximum safe dose fo lignocaine wit adrendine, i.e., 500 mg must not be crossed.

2. **Position :-** Lithotomy position
3. **Cleaning and draping** of the part should be done.
4. **Thorough proctoscopic exasmination** is performed to identify the haemorrhoidal masses and thei positions.
5. **Digital anal dilatation** of not more than six finger, a procedure similar to that described by Recamier an Maisonneuve, can be done instead of the lord procedure, intra canal packing is given to avoid soiling durin operation.
6. **Revelation of the "Triangle of Exposure' :-** The skin covered component of each of the main pile mas is seized with allies tissue holding forceps in usually 3, 7, 11 O' Clock positions and retracted ouwards Allies tissue forceps being kept in anatomical positions. This reveals the "Triangle of Exposture' i.e. mucosa component or internal hamorrhoids at upper pole and dermal component in the grip of allies forceps a lower pole.

7. **Holding of pile masses :-** Left lateral internal pile is grasped with pile mass holding forceps. The two forceps attached to left lateral pile are taken in the palm of left hand frawn outswards and left index finger in used to stabilize the inner aspect of the pile mass.

8. **A semi-circular groove is made :-** With scissors in the anal and perianal skin including the external part of haemorrhoids held with Allies tissue forceps. The incision should reach the muco-cutaneous junction but not extend into the mucosa. All this while, the index finger is firmly pressed against the scissors and traction maintaned so that lower edge of internal sphincter is preserved and not included in the tissue of transfixation of the pedicle of piles with Kshara Sootra.

9. **Crushing of pedicle of pile mass :-** Without carrying out further dissection, Pile mass crusing clamp is applied to the external and internal pile components held with two forceps. The pile masses are twisted and the pedicle of pile mass is crushed with the help of ple mass crusing clamp unitl it assumes a thinned out shape.

10. **Transfixation of pile mass :-** Kshara Sootra loaded on 76 mm round body curved needle is passed through the base sof crushed pedicle and transfixation of both external and interanl part of haemorrhoidal massis done with Kshara Sootra.

11. **Ligation of pile mass :-** Pile mass curshing clamp is removed only after ensuring tight ligature at the crushed base of the pile mass.

12. **Excision:-** The haemorrhoidal mass is excised about 5mm. distal to ligature and Kshara sootra is left in situ for further insepection at the end of the operation.

13. **Right posterior** and last of all, right anterior haemorrhoidal masses are to be dealth with in thesmae manner except that the pile masses are held in lright hand and the groove made with left hand.

14. **The three transfixed** and ligated pile masses are inspected once again at the end of the operatin, haemostasis ensure, transfixed Kshara Sootra divided to a short length.

15. **Gauze soaked in Jatyadi Taila** is placed inside the canal of safe guard the anal canal from corrosive action of extra Kshar. One end of anal packin given initially is withdrawn out for facilitating easy removal.

16. **T- bandage is given** to hold the lay - on dressing in position.

Paschata Karma :-

1. Simple non-narcotic analgesics (paracetamol) can be given to the patient on demand.
2. Inravenous fluid perfusion is restricted to minimum (not more than 500 ml.) to avoid urinary retention.
3. Patients are orally allowed after 3 hours of operation.
4. Regular monitoring for haemorrhage is done, without disturbing anal dressing.
5. Dressing is removed nex morning after luke warm sitz bath.
6. Bulk evacuant (Isabgol-triphala) is prescribed and light diet is advised till first bowel movement.
7. The excision of haemorrhoidal masses with automatic removal of Kshara Sootras and wound healing are monitored daily till discharge of patient from hospital.
8. Patients are reviewed at Day 1, 3, 7, 15, 30 post operatively.

Kshar-Paatan in the Case of Interno- external Haemorrhoids

पथ्य - अपथ्य :-

अरिवत्प्राणिनो मांसकीलका विशसन्ति यत्। अर्शांसि तस्मादुच्यन्ते गुदमार्गनिरोधतः।।

(अ. ह. नि. 7)

अर्शसां प्रशमे यत्नमाशु कुर्वीत बुद्धिमान्। ताम्याशु हि गुदं बद्ध्वा कुर्युर्बद्धगुदोदरम्।।

(अ. ह. नि. 8/59)

महान्ति प्राणवर्तांश्छत्वा दहेत। छत्राकारण्यूर्ध्वविसृतानि क्षारसूत्रेण बध्वा।। (अ. सं. चि. 7/3)

वेगावरोध स्त्री पृष्ठयानमुत्कटुकासनम् यथास्वं दोषलंचान्नमर्शसः परिवर्जयेत्।

रक्तर्शसामुपेक्षेत रक्तमादौ सवेद्धिषक्। दुष्टास्त्रे निगृहीते तु शूलनानाहावसृग्गदाः।। (चक्र. 5/111)

शुष्कार्शसां प्रलेपादिक्रिया तीक्ष्णा विधीयते। स्राविणां रक्तमालोक्य क्रिया कार्य्यासुपैतिकी।।

(चक्र. 5/3)

द्विविधान्यर्शांसि कानिचित् सहजानि, कानिचिज्जात स्योत्तरकालजानि।। (च. चि. 14/5)

षडर्शांसि भवन्ति वातपित्तकफशोणितसन्निपातैः सहजानि चेति। (सु. नि.)

चतुर्विधोऽर्शसां साधनोपायः। तद्यथा भेषनं क्षारोग्नि शस्त्रमिति। मृदु प्रसृतावगाढान्युच्छ्रितानि क्षारेण।।

(सु. अर्श. चि.)

कुटज बिल्वचित्रकनागरातिविषाभया धन्वयासक दारूहरिद्रा वचाचव्यानीति दशोमान्यर्शोघ्नानि भवन्ति।।

(च. सु. 4/11)

अर्शांसीत्यधिमांसविकाराः। (च. चि. 14/5)

अर्शोरोगयतोऽर्शसुः। (अमरकोष)

दुर्नामकार्शसी।। (अमरकोष)

वलिकाकारे गुह्यस्थरोगभेदे।। (वाचस्पत्यम्)

□□□

Chapter - 11

Application of Kshara Sootra in Rectal Prolapse

Introduction :-

'Gudabhramsa' is the term derived from two words viz 'Guda' and 'Bhrmsa' denotes the displacement of an entiry form its normal position. Susruta has descibed it under 'kshudra rogas'. Vagbhata has also described itis management in the context of 'Artisara chikitsa' as a complication of it. In charak samhita it is mentioned under the vata vyadhis and in some other texts it is given as a disease occuring in rooksha and durbal deh people who strain and suffer from diarrhoea. In such people the guda i.e. rectum comes out and is known as Gudabhramsha.

It can be correlated with rectal prolapse mentioned in modern science. Rectal prolapse is a condition in which the rectum displaces downwards and turns inside out. Initially, the rectum stays inside the body but as the condition worsens, it may protrude outside through the anus. There is often weakness of the anal muscles, which may result in leakage of mucus or stool.

Demographics :-

The overall incidence of rectal prolapse in the United States in approximately 4.2 per 1, 000 people. The incidence of the diorder increases to 10 per 1,000 among patients older then 65. Most patients with rectal prolapse are women: the ratio of male-to-female patients is one in six.

Types :-

There are two types of rectal prolapse :-

1. **Incomplete :-**

Incomplete rectal prolapse involves the abnormal protrusion of rectal mucosa and submucosa through the anus. The length of such prolapse in never more then 3.75 cm. There is a partial overlap of this diagnosis with chronic prolapsed haemorrhoids, espiecially if part of the prolapse is hemorrhoids, and part of the tissue is rectal mucosa. If the protrusion of rectal mucosa is only partial, then this is called a partial mucosal prolapse.

2. **Complete :-**

Involving both the rectal mucosa and the rectal wall - This is also called as Rectal Prolapse and Procidentia. Prociidentia is a condition in which the rectum literally turns inside out and can extend as far as eight inches byeond the anus. Whether weak musculature of the pelvic floor and anal canal is a cuase of an effect of this condition is still a matter of controversy. It is often accompanied by prolapse of uterus. A possible etiology is herniation of the cul-de-sac (a displacement of the rectum form its usually protected place in the hollow of the sacrum). In the horse, procidentia is a natural occurrence at the time of each bowel movement, but this is not true in humans.

Differentiating clinical features of partial and complete rectal prolapse.

Partial rectal prolapse	Complete rectal prolapse
Length < 3.75 cm	Length > 3.75 cm
Common in children	Common in adult and old
Pink in colour	Red in colour
Radial folds	Concentric rings
Mucosa and submucosa descends	Complete thickness of wall of rectum

Who is at risk? :-

Patients with rectal prolapse are generally at extremes of a age i.e. very young and elderly.

Common causes of Rectal Prolapse :-

Rectal prolapse is caused by weakening of the ligaments and muscles that hold the rectum in place. In most people with a prolapsed rectum, the anal sphincter muscle is weak. The exact cause of this weakening is unknown: however, rectal prolapse is usually associated with the following conditions:

- Advanced age
- Long-term diarrohea (15%)
- Long-term straining during defecation
- Poor bowel habit, especially constipation - 52%
- Neurological disorder (e.g., spinal cord injury)
- Female gender
- Deep pouch of douglas
- Patulous anus
- Diastasis of levator ani muscle
- Decreases sacral curvature and decreased anal canal tone are the probable causes in infants.
- Operative procedure (e.g. hemorrhoidectomy, fistulectomy)
- Psychotic - 3% (John Cedric Goligher)
- Reduced ischiorectal fossa fat.
- Pregnancy and the stresses of childbirth
- Cystic fibrosis
- Chronic obstructive pulmonary disease
- Whooping cough
- Multiple sclerosis
- Paralysis (Paraplegia)
- Long-tern haemorrhoidal disease is frequently associated with mucosal prolapse that does not progress to complete rectal prolapse.

Aetiopathogenesis for partial rectal prolapse :-

Infants - Infants lack a normal sacral curve, and have undeveloped resting anal tone.

Children - Children presenting with rectal prolapse may have faulty bowel habits or may be associated episodes of diarrhoesa, whoooping cough, or malnutrition causing loss of ischiorectal fat or worms, particularly Trichuris trichiura may also play a part. Rectal prolapse in children may be a sign of Cystic Fibrosis.

Adults - In adults, partial mucosal prolapse is corelated with 3rd degree hemorrhoids. In females partial or complete mucosal prolapse may be due to anal injury during delivery, or other pelvic operations.

Elderly patients may present with a history of chronic constipation or laxative abuse. They may have lax pelvic floor musles or reduced anal sphincter tone.

Excessive straining due to uretheral obstruction from enlarged prostate or excessive coughing may be the cause.

May be a complication of surgery for fistula in ano or fissure where a large portion of muscle is divided or if excessive stretching of anal sphincter is done.

Aetiopathogenesis for complete rectal prolapse :-

- Long history of difficulty with defaecation
- Laxity of anal sphincters
- Rectal intussuception
- Disordered functions of pelvic floor muscles
- Lack of rectal fixation i.e. weak muscles of pelvic floor
- Sliding hernia - There may be the peritoneal pouch on the anterior aspect of prolapse

Symptoms :-

The symptoms of a prolapsed rectum are similar to those of haemorrhoids; how ever rectal prolapse origintates higher in the body than haemorrhoids do. A person with a prolapsed rectum may feel tissue protruding from the anus and experience the following symptoms.

- Pain during bowel movements
- Mucus or blood discharge from the protruding tissue
- Faecal dincontinence (inability to control bowel movements)
- Loss of urge to defecate (Mostly with larger prolapses)
- Awareness of something protrucding upon wiping

When a complete rectal prolapse occurs, the rectal wall protrudes and turns inside out forming concentric rings (procidentia), where as if an incomplete prolapse occurs, only the rectal mucosa protrudes. At first, prolapse of the rectum may occur only at defecation and retracts afterwards. Later, the protrusion may become more frequent and accompany sneezing and coughing, and may also occur at any sort of exertion. Eventually protruding rectum may need to be replaced or may continually protrude. There have been reports of patients - although few, who have developed gangrene from this condition.

Examination and Tests :-

Rectal examination - If a paitent's prolapse in intermittent, he will give a history of sometimes for several centi-metres. When a rectal examination is done, his anal sphincter feels weak. To find out if his prolapse is partial or complete, put the finger into his rectum, and feel the protuding ring of mucosa between the finger and thumb. If the two layers of mucosa are felt, is incomplete, if more tissue than merely mucosa is felt, it is complete.

Diagnositc studies include rectal examination, sigmoidoscopy, and possibly a barium enema. Anorectal manometry may aslo be used to measure the strength of the muscles of the anus.

A defecogram (a test evaluates bowel control) may help distinguish between a mucosal prolapse and a complete prolapse. Children with unexplained rectal prolapse should have a sweat chloride test done to evaluate for Cystic Fibrosis.

Cystic Fibrosis - Rectal prolapse in cystic fibrosis is probably related to pelvic florr disoroder. Pelvi-perineal muscles, connective, adipose tissue and components of pelvic fascia may be involved.

Malnutritions in Cystic fibrosis affects the structure that usually support the rectum and coughing and straining during sticky and bulky bowel movements increase the pressure on the rectum thus pushing it out.

Sweat chloride test :- A 3 mili ampere electric cuurent is used to carry pilocarpine into the skin of forearm and locally stimulate sweat glands. Wash arm with distilled water and collect the sweat into filter paper or gauze.

After 30-60 minute filter paper is removed, weighed and diluted in distilled water. At least 50 mg sweat should be collected. Achloridometer is used to analyze the chloride in samples.

In infants-upto 6 Months :-

Chloride level -

29 mmol/litre	Cystic fibrosis unlikely
30-59 mmol/litre	Intermediate cystic firbrosis is possible
>60 mmol/litre	Cystic fibrosis is likely to be diagnosed.
> 6 months of age :-	
39 mmol/litre	Cystic fibrosis unlikely
40-59 mmol/litre	inter mediate cystic fibrosis is possible
>60 mmol/litre	Cystic fibrosis is likely to be diagnosed

Differential diagnosis :-

Prolapse of the rectum has to be differentiated from

- Large prolapsed haemorrhoids,
- Polyps,
- Tumors, Intussusception

It is aso important to distinguish between mucosal (incomplete) and complete prolapse. In a prolapse one can not enter the anal canal at any pint, but can pass the finger between an intussusception, or a rectal polyp, and the anal wall.

Differential diagnosis :-

Diseases	Differentiating features from rectal prolapse
Prolapsed haemorrhoids	Lobular, definite sulcus or groove is present between the masses.
	Plum or blue coloured.
Large rectal polypoid lesion prolapse	O/E after reduction - mobile, can be separated from lower part of rectum by digital Pressure.
	Proctosigmoidoscopy will clarify diagnosis.

Treatment :-

Conservative Treatment :-

Bulking agents (such as bran or psyllium), stool softeners, and suppositories or enemas are used for these purposes. Stool softeners, such as sodium docusate (Colace) or calcium docusate (Surfak), may be used to reduce pain and straining during bowel movements.

- Avoid straining during defaecation
- Nutritious diet

Digital repositioning of the partially prolapsed rectum by the help of lubricated index finger of MANUAL REPLACEMENT AND STRAPPING. Using a glove and xylocaine jelly, replace the prolapse manually.

Medical treatment :-

Oral - Changari ghrita

Local - Mushak tail

Musaka tails (Su.Ci 20/62-63) - Rat (whose intesine has been removed) and Vrahat panchamoola are treated with milk. Tailapaka is performed with this milk and some Vatahara drugs. This is used by local as well as oral routes.

Changeri ghrate (A.H. Ci 9/48) - Ghritapaka should be performed with milk, changeri, kola, Curd and ghee: all one prastha and sunthi one Kudava, It should be taken orally.

Parasurgical

- Strapping
- Sclerotherapy
- Kshara sootra karma

Strapping :-

Strap the buttocks securely together with a large gauze pad up against the anus. Apply large square to each buttock, Join these with a 2.5 cm transverse strip, so as to close the buttocks and leave this strip on during defaecation. Afterwards, remove it, clean the buttocks, and replace it with a fresh strip.

Procidentia in children usually can be corrected by conservative measures. These include : a nutritious diet, avoiding straining at stool, and immediate replacement of the bowel after each protrusion to avoid swelling and possible difficulty in reduction . Children frequently "outgrow" the disease as at natural curve of the sacrum becomes more concave, and surgery may not be needed.

Gallows traction is controversial. Some surgeons don't use strapping and proceed immediately to gallows traction. Suspend the child in the gallows position for a few days to two weeks.

Sclerotherapy :-

Injections of scleroising agents such at 5% phenol in almond oil in the hollow of the sacrum have helped many patients with procidentia. This is tried in children only if digital repositioning fails for 6 weeks. This can also be tried in adults.

Technique :-

The base and apex of prolapsed in injected circularly and the tip of the needle should reach the submucosa. 10 ml of such solution may be injected in one sitting. The aseptic inflammation following the injection leads to fibrosis and the mucous membrane becomes fixed to the muscular coat and is drawn in.

Technique of using kshara sootra in gudabhramsha :-

Poorav Karma :-

- Written informed consent of the patient and attendatnt is taken.
- Anti-tetanus prophy laxis is given.
- Xylocaine sensitivity test is done.
- Preparation of operative field is done by means of cleaning, shaving and painting.
- First soap water enema or peglaec solution is given 12 hours prior to operation
- Patient is kept nil orally for 12 hours before operation.
- Another soap water enema is given in the morning of operation day.
- Premedication of the patient is done as and when required 1/2 hour before the procedure. Injection Promethazine is given to make the patient calm i.e.for sedation without depression.

Pradhana Karma :-

Position of the patient :-

A simple lithotomy position is requried to carry out the minimum invasive technique . The Kshara sootra is used in place of any other non-absorbable setone as mentioned in Thiersch procedure.

Preparation of the operative field :-

The conventional rituals are observed to prepare the operative field by scrubbing, cleansig and painting with antiseptic solutions followed by draping of the part with sterile linens.

Anaesthesia :-

Haemorrhoidal Block :-

1% lignocaine with adr. Hcl is given in the dose of 5-7 mg/kg body weight in fan shaped direction about 1cm below and above the anal orifice in midline using 21 G needle.

Transcuataneous pudendal nerve block :-

The inchila tuberosity is take as the landmark to perform transcutaneous pudendal nerve block .The tuberosity is palpated subcutaneously through the buttock and 7.5cm long needle (21G) is introduce into the pudendal canal along the medial side of the tuberosity. The pudendal canal lies about 1 inch (2.5cm) deep to the free surface of the ischial tuberosity. The local anaestheitc 5 ml of 1% is then infiltrated around each side of the pundendal nerve (Rt & Lt.).

Digital rectal examination is performed once again to exclude nay specific pathology.

The proctosigmoidoscopy is also carried out, if it is required.

Method of kshara sootra ligation in complete rectal prolapse :-

Procedure :-

Step I - Incision :-

A short incision is made in midline, anteriorly and posteriorly at 12 and 6 o'clock postitions, about 1.25 cm from the anal verge.

Step 2 - Insertion of needle :-

Two large bore hollow needles are taken (spinal needles of 16 G). The needle is inserted on left side through the posterior wound in the subcutaneous plane, in such a way as to encircle the anus 1 cm form the anal orifice, until it's point or tip emerges from the anterior wound. Similarly, the other needle is inserted form right side.

Step 3 - Application of Kshara sootra :-

The kshara sootra is intoduced through the opening of the spinal needles at 12o'clock. Spinal needles are now withdrawn and the two ends of ksharea sootra are ligated at 6o'clock position.

Step 4 - Tying of the knot :-

The index finger is introduced into the anal canal and kshara sootra is tightened around the finger, so that the anus allows the entry of one finger. Now the finger is withdrawn and the ends of the kshara sootra are clipped short.

Stpe 5 - Burial of the knot :-

The kshara sootra is rotated a little bit to bury the knot such that it lies on the lateral side in the subctaneous tissue, away from the site of incision.

Step 6 - Closure of the incision :-

The incisions given are closed with single suture at the end an antiseptic dressing is applied. T-bandage is given to hold the lay on dressing in position.

Points to be kept in mind :-

1. Getting the correct tightness of the kshara sootra is difficult. it requires expertise. If it is too tight, it will interfere with defaceation, an cause faecal impaction, or the Kshara Sootra may cut out. If it is too loose, it will not cure prolapse.
2. Make sure that patient can pass stools normally before discharge. The major complications are breakage of the kshara sootra, and difficulty in passing even a soft stool, if the suture is too tight. Advise high-fibre diet.
3. The main complication is that the wound may get infected and result in a discharging sinus or abscess formation.
4. Kshara sootra is only suitable in debilitated adult patients unfit for surgery.

The kshaar sootra is required to be in place that is there in the substance of internal anal sphincter for minimal 2 weaks so as to ensue the process of aseptic inflammation leading to the cncircling fibrosis in the internal ana; sphincter region.

Method of kshara sootra ligation in partial or mucosal prolapse :-

Procedure :-

Step - 1 Revelation of the mucosal prolapse :-

Step - 2 Holding of the prolapsed mass :-

After visualizing the rectal prolapse carefully, it is held with the help of babcock's tissue forceps with slight traction. The traction of prolapse should not be huge as it may cause tear of the prolapsed mass.

Step - 3 Transfixation of the prolapsed mass :-

After holding the prolapsed mass, its base is transfixed using Kshara sootra on a round body needle.

The transfixation of the prolapse is done with the help of kshara sootra on two needles.

The first needle is pierced through the base of the prolapse at a distance 1/3rd from one end.

In the same way, the second needle is also pierced through the base of the prolapse at a distance of 1/3rd from the other end.

Now kshara sootra is cut proximal to the needles.

Step - 4 Ligation of the base of prolapse :-

After proper transfixation of tha base, the free ends of the Kshara sootra are ligated, two knots on the two sides and one knot at the centre. The kshara sootra above the knot is cut leaving 2-3 cm above it.

Consequently sterile gauze piece soaked with jatyadi taila is placed inside the anal canal to safaguared form corrosive action of extra kshara and further aid in wound healing thereafter.

T-bandage is applied to secure dressing in position.

Paschata Karma : -

- Simple non narcotic analgesics whenever required.
- Patient is kept nil orally for 3 hours.
- Regular monitoring for haemorrhage is done without disturbing the anal dressing.

Post operative care and prescription :-

- Dressing is removed next morning after that ushnodaka avaghana is given.
- Patient is instructed not to strain during defaecation and is advised mool bandh.
- Instillation of jatyadi taila into the anal canal with the help of No. 6 rubber catheter attached with a 5ml of syringe is done.

Triphala gugulu	-	2 tablets x BD
Aamalaki churna	-	4 gm x BD
Isabgahol powder	-	2 TSF x HS
Panchsakara churan	-	2 TSF x HS

ASD daily till discharge of the patient with jatayadi taila.

Diet : -

Light bland diet, leafy vegetables, milk, cream, curd, lassi etc. Plenty of water orally. Such a regimen is to be followed for 4 weeks.

Surgical treatment :-

Many operations have been designed, can be grouped as,

1. Narrowing of anal orifice
2. Obliteration of the peritoneal pouch of Douglas
3. Restoration of the pelvic floor
4. Resection of bowel:
   - Trans-abdominal
   - Perineal
   - Transsacral
5. Suspension or fixation of the rectum
   - To sacrum
   - To pubis
   - To other structures
6. Combination of the two or more of the above

In adults with procidentia who are high-risk patients, abdominal surgery is usually indicated. There several surugical approaches. A relatively simple operation fixes the rectum in the hollow of the sacrum. Anot method is resection and low anastomosis of the sigmoid with the rectum. In patients unable to withstand and dominal operation, resection and anastomosis can be performed by a perineal approach.

Surgical treatment can be divided into 2 categories according to the approach used to repair the rec prolapse: abdominal procedures and perineal procedures. The choice of abdominal versus perineal procedure mainly dictated by the patient's age and comorbidities. The choice of procedure is also dictated by the presence absence of constipation. Children are treated with linear cauterization.

7. High or supralevator thiersch operation.

Pre-operative care :-

Ensure a full mechanical and antibiotic bowel preparation before surgery, regardless of the type of proc dure being planned. Perioperative intravenous anti-biotics are often used, especially if a non-absorbable material being planned as material.

Intraoperative details :-

Abdominal procedures :-

These procedures are typically performed in younger, healthier patients whose life expectancy is longer

Anterior resection :-

Patients with rectal prolapse and constipation often hava a redundant colon, and resection of it is thought to improve constipation and cure rectal prolapse. In an anterior resection for rectal prolapse, the recum is mobilized to the level of the lateral ligaments, and the redundant colon (sigmoid) is resected. The remaining colon is then anastomosed to the top of the rectum. This is performed without laxity in the colon so that the rectum is held in place and can no longe prolapse. Few perform this procedure because it is not thought to address anatomical abnormalities such as poor rectal fixation.

Marlex rectopexy :-

In a marlex rectopexy (Ripstein procedure), the entire rectum is mobilized down to the coccyx posteriorly, the lateral ligaments laterally, and the naterior cul-de-sac anteriorly. The marlex rectopexy is illustrated in the image below. A non absorbable material, such as Marlex mesh or an ivalon sponge, is then fixed to the presacral fascia. The rectum is then placed on tension, and the material is partially wrapped around the rectum to keep it in position. The anterior wall of the rectum is not covered with the sponge or mesh in order to prevent a circumferential obstruction.

The peritoneal reflextions are then closed to cover the material used in wrapping and fixation. The Marlex mesh or sponge causes an inflammatory reaction that scars and fixes the rectum into place. Do not perform this procedure on patients who have a large component of constipation or a very redundant sigmoid colon because the symptoms are likely to worsen. If the rectum is inadvertently punctured or pierced during mobilizaion, mesh formed of non absorbable material shall not be implanted because of risk of infection.

Suture rectopexy :-

This operation is esssentially the same as a Marlex rectopexy except that the rectum is fixed to the presacral fascia with suture instead of mesh or a Ivalon sponge.

Resection rectopexy :-

Resection rectopexy (Frykman Goldberg procedure) is a combination of the anterior resection and the Marlex rectopexy and is a good option for patients with a significatn component of onstipation. Therectum is completely mobilized to the coccyx posteriorly, to the lateral ligaments laterally (some surgeons divide the lateral ligaments), and to the cul-de-sac anteriorly.

The redundant sigmoid colon is then resected, and the remaining colong is anastomosed to the top of the rectum. The lateral ligaments or the rectal fascia are then sutured to the presacral fascia with the rectum in tension, which keeps the rectum in place and prevents further rectal prolapse. The rectopexy is accomplished with sutures instead of nonabsorbable mesh because the bowel is opened for the anastomosis and the mesh may become contaminated.

Wells operation (Posterior sling rectopexy) :-

Rectum is mobilized posteriorly down to the levator ani. Anterior mobilization of the recum is also performed. A piece of Ivalon is then placed in the pelvis, sutured to the presacral fascia with nonabsorbable sutures. Wrapped around the rectum which has been retracted cephalad. Sponge is then sutured to the rectum such that only three-fourths of the rectum is wrapped.

Perineal procedures :-

Perineal procedures have a higher recurrence rate but a lower morbidity rate and are often performed in the elderly population or in patients who have a contraindication to general anesthetic.

Anal encirclement :-

With anal encirclement (Thiersch wire), a nonabsorbable band is placed subcutaneously around the anus. The purpose of this procedure is to keep the rectum from prolapsing by restricting the size fo the anal lumen. Although initially described using a wire, other materials (eg. silastic tubing, nonabsorbable suture) have replaced it. The therapy is effective in mechanically preventing the rectum form prolapsing, but it does no treat the underlying disorder.

Indications :-

1. Children in whom strapping and/or gallow traction have failed.
2. Elderly debilitated adults whose life has been made miserable by rectal prolapse

Delorme mucosal sleeve resection :-

A circumferential incision is made through the mucosa of the prolapsed rectum near the dentate line: using electrocautery, the mucosa is stripped from the rectum to the apex of the prolapse and excised. the denuded prolapsed muscle is then pleated wit tha suture and is reefed up like an accordion. The transected edges of the mucosa are then sutured together. This procedure is often used for samll prolapses but may also be used for large ones.

Altemeier perineal rectosigmoidectomy :-

A full-thickness circumferential incision is made in the prolapsed rectum at about 1-2cm from the dentate line. The hernia sac is then entered, and the prolapse is delivered. The mesentery of the prolapsed bowel is serially ligated until no further redundant bowel can be pulled down. The bowel is transected and hand sewn to the distal anal canal or stapled using a circular stapler. Before anastomosis, some surgeons plicate the levator ani muscles anteriorly, which may help to improve the continence.

This operation is relatively safe and effective in frail, older patients, with post-operative morbidity being low. How ever, the recurrence rate of prolapse following the procedure was not considered to be negligible, and the surgery was found to be unpredictable in terms of restoring continence.

Surgery for mucosal prolapse :-

Mucosal prolapse is treated with a haemorrhoidectomy. Excision of the prolapsed mucosa is performed only if the partial prolapsed has involved only a part of circumference. The base of the prolapsed segment is ligated with Goodsall's ligature and the redundant mucosa excised. This technique may be adopted in case ofpartial prolapse associated with 3rd degree haemarrhoids.

Postoperativ Details :-

Abdominal procedures :-

Postoperatively, patients usually have an ileus and incisional pain. Intravenous fluids are maintained until liquids are started with the return of bowel function or earlier, depending on whether an anastomoisis hans been performed. As bowel function improves, diet can be advanced. Patients with an anasomosis are maintained on a low-fiber diet for 2-3 weeks and are then started on fiber supplementation to help prevent the return of constipation and straining. Patients without an anastomosis can be started on a high-fiber diet sooner. A Foley's catheter is placed perioperatively and is left in place of several days because the rectal dissection can inhiit bladder function. The lenght of hospital stay averages 3-7 days and is usually dependent on the return of bowel function and the control of incisional pain,

Perineal procedures :-

Patients who have had perineal procedures do well postoperatively with minimal pain and a short hospital stay. Initially, patients receive nothinhg by mouth for approximately 12-24 hours, After this period liquids are instituted, and patients are rapidely advanced to a regular diet. Bowel function returns quickly because there is no abdominal incision, and patients can often be discharged 24-72 hours after the procedure.

Other Complications :-

Other complications, such as myocardial infarction, pulmonary embolus, deep vein thrombosis, and hernia, can occur but are not unique to these types of procedures.

Infection :-

The most common source of infection is from inadvertent injury to the rectum during mobilization in abdominal procedurs. If unrecognized, this can lead to leak of intestinal contents with pelvic abscess and sepsis.

Bleeding :-

Bleeding most commonly occurs in 2 situations. First, the presacral veins can be torn during abdominal procedures, when mesh or the rectum is directlyfixed to the presacral fascia. This can lead to a presacral hematoma or to torrential bleeding. This bleeding can be difficult to control because the veins exit directlyfrom the bone. Dissection in the presacral space ofter increases bleeding and should be avoided.

The second common situation for bleeding occurs during the mucosal stripping in a delorme procedure of form wound separation postoperatively.

Bowel injurey :-

Bowel injury most frequenctly occurs during mobilization of the rectum. If it is recognized, the injury can usually be repaired without need for intestinal diversion. Foreign material should not be implanted if the bowel is injured. Unrecognized injury can lead to absces fromation and pelvic sepsis.

Anastomotic leak :-

All procedures involving a resection carry a risk of anastomotic leak. abdominal procedures complicated by a leak require re-exploration. If the leak is small and contamination in the pelvis is limited, the anastomosis can be revised and protected with a diverting loop ileostomy. If the leak is large with significant dehiscence of the anastomosis, the patient is often best served with a Harmann procedure (colostomy with rectal stump). Often, pelvic sepsis makes further dissection in the pelvis challenging, and revising or performing a new anastomosis can be very difficult. Anastomotic leak can also occur after perineal rectosigmoidectomy. Despite the fact that this is a very low anastomosis, leak is rare. The infection is localized and pelvic sepsis is rare when leak occur after this procedure.

Bladder and sexual function alterations : -

The pelvic sympathetic and parasympathetic nerves run along the rectum: if dissection is not carried out in the proper plane, injury can occur, leading to bladder dysfunction, impotence, and/or retro-grade ejaculation. This is a important when trying to decide which procedure to perform, especially in men

Constipation/outlet obstruction :-

Perineal procedures and anterior resection have a low risk of outlet obstruction. Abdominal proceduresT that tack the rectum to the sacrum can cause outlet obstruction if the rectum is wrapped circumferentially, often requiring release of the fixation to treat the problem.

Kshar-Paatan in the
Case of Partial Rectal Prolapse

प्रवाहणातिसाराभ्यां निर्गच्छति गुदं बहिः। रूक्षदुर्बलदेहस्य तं गुदभ्रंशमादिशोत्।। (सु. नि. 13/

गुदभ्रंशे गुदंस्विन्नं स्नेहाभ्यक्तं प्रवेशयेत्। कारयेद् गोफणबणाबन्धं मध्यच्छिद्रेण चर्मणा।
विनिर्गमार्थं वायेश्च स्वेदयेच्च मुहुर्मुहुः।।

चांगेरी घृत :-

(सू. चि. 20/

गुदनिःसरणे शूले पानमम्लस्य सर्पिषः। प्रशस्यते निरामाणामथवाऽप्यनुवासनम्।।
चाङ्गेरी कोलदध्यम्लनागरक्षारसंयुत्तम्। घृतमुत्क्वथितं पेयं गुदभंशरूजापहम्।।

मूषक तेल :-

(च. चि. 19/42-

गुदभ्रंशे गुद स्विन्न स्नेहाभ्युक्तं प्रवेशयेत। कारयेदगोफणाबन्धं मध्यच्छिद्रेण चर्मणा।।
विनिर्गमार्थें वायोश्च स्वेदयेच्च मुर्हमुर्हः। क्षीरे महत्पञ्चमूलं मूषिकां चानवर्जिताम्।।
पक्त्वा तस्मिन् पचेत्तैलं वातघ्नौषधसंयुतम्। गुदभ्रंशमिदं कृच्छं पानाभ्यङ्गात् प्रसाधयेत्त्।।

(सु. चि. 21/61-

Chapter - 12

Application of Kshara Sootra in Fissure - In- Ano

Introduction :-

In classical literature of ayurveda a number of conditions have been described in relation of Guda.It is surprising to note that although anal fissure is one of the common ailments in ano rectal area, still it has escaped of the notice of ancient scientists. However, a detailed exploration of literaure suggests some words, which clinically may resemble these entities. The clinicians hav recently coined a word Guda-Vidara to represent this condition but this word does not have any origin in the orginal classics of Ayurved. Parikartika is word which has been refereed to in earlier three samhitas of Ayurveda not a separate entiety, but as a complication of other diseases pertaining to colo-rectal and oesophageal regions and their therapies.

Ancient literatures including Vedas have a rich description of various disease and their management. But 'parikartika' is not described in Vedas and other authour also have paid poor attention to its description as compared to othe diseases. This may be attributed to excellent general condition of health, hygiene and nature habit of ancient people. Perhaps they had regular dietary and bowel habits and may not be indulged in consumption of chillies and spices in their diets.

Definition :-

Parikartika denotes cutting or cutting pain all around.

According to Dalhana, the commentator of Sushruta samhint, there is cutting and tearing pain every where.

Guda parikartika has been correlated with fissure in ano by many authors.

Definition :-

1. The term fissure denotes a crack/split/cleft/groove
2. Anal fissure has been described as an acute superficial break in the continuity of anoderm usually in post midline on anal margin.
3. The squamous mucosa of lower half of anal canal is prone to superficial ulceration, which present clinically as an anal fissure. It is linear ulcer, usually situated in posterior commissure of canal (Devis Christopher)
4. This is a common disease of anus which causes an amount of suffering out of all proportion to the size of lesion. A fissure consists essentially of a crack in skin line part of anal canal which often shows a considerable reluctance to heal (Goligher)
5. Examination of lower half of anal canal by separatioin of buttocks to open up the perianal area will reveal presence of any simple anal fissure as it is located below the dentate line and is always confined to the anoderm in mid posterior position or mid anterior position.

Synonyms :-

1. Anal ulcer
2. Anal fissure
3. Ulcer - in - ano
4. Chronic ulcer
5. Faecal ulcer

Age :-

It is usually encountered in yound or midle age but sometimes seen at infancy and early childhood (Bennet). Hamilton says that is not uncommon in children and frequently the diagnosis is missed. Bacon has advocated that fissures are more common in meridian of life.

Sex :-

Anterior fissure is more common in women than men and accounts for 40% in women contrasted with 10% in men. Posterior fissure is 90% in men and 60% in women.

Location :-

It is found mostly on midline posteriorly and may be mid line anterior (Bailey and love). Exceptionally it is found elsewhere on the circumference of the anus.

Bacon says anal ulcer is usually single, when multiple it is likely to be of tuberculous syphilitic or chanacroidal origin.

Nidana - Aetiology :-

Other classification of Aetiology is as below :-

1. **Vyadhi nimittaja :-**

That which is produced after a disease of during the diseased stage. Charak has described the disease parikartika in the chaper of Atisar-Vyapada where he has described the clinical features of vataja-atisara. According to him there is scanty hard stool with froth and sound gripping and cutting pain in guda and prolapse of rectum. Further he has mentioned parikartika, while describing treatment of jwara. In fever there is generalized dehydration so that the bowel are not clear and passage of even a single hard motion is enough to result into fissure and create other complication.

2. **Vaidya Nimittaja :-**

There are some disease/ complication which are produced by inexperienced physician. Parikartika is one of such disease produced by wrong conduction of therapy. Sushruta has described that parikartika mostly develops after a wrongful conduction of using the process of medication via rectal route by a rough and thickvasti netra. Charak has also considered the wrongful use of vasti netra as the cause of parikartika. He says that if contents of vasti which is unctuous, acute and if high dose is given to a person of mild bowel or suffering form slight morbidity causing precipitous elimination of faecal matter produces parikartika.

According to Davis main etiology is infection.

Boyd says that there are only two reasons for fissure -

1. Trauma by passage of thick column of hard stool.
2. Loss of elasticity due to chronic infection and fibrosis.

He says 95% lesions are situated in posterior commissure due to fibers of external sphincter (whcih encircle the anus) fuse much more completely in fornt than behind. So the mucosa of posterior aspect of anal canal is less strongly supported and more easily torn.

Mahadevan says that the main cause is trauma due to pasage of hard stool and over distension of anal canal by it. The fibers of sphincter ani externus decurssate on their ways to get attached to coccyx leaving a weak spot in posterior midline. In a person who takes laxatives, purgatives or has a irritable colon, the absence of normal stretching by solid faecal mass results in fibrous contracture of sphincter. In such condition, a tear will easily occur when a hard stool is passed.

Bailey and love also added that the anterior anal fissure is more common in women particularly who have children because of lack of support of anal mucus membrane by a damaged pelvic floor. They also quoted that incorrectly performed haemorrhoidal surgery, in which too much skin is removed resulting into anal stenosis is also a cause for fissure.

It has also been hypothesized that failure to heal is secondary to poor perfusion of the anoderm in posterio midline. According to this hypothesis, posterior midline ischemia is the result of arterial anatomy and intenal anal sphincter hypertonicity.

Angiographic and anatomical studies of inferior rectal artery shows compromised blood flow in posterior midlin. Laser Dopper flowmetry demonstrate low perfusion in posterior midline and to a lesser exent in anterior midline. There is manometric evidence of sustained hypertonicity of internal anal sphincter and an inverse correlation has been demonstrated between anal preseure and anodermal blood flow, the higher anal pressureand the lower blood flow.

S. Das has given 4 reasons for predominance of posterior fissure :-

1. Posterior angulation of anal canal.
2. Relative fixation of anal cala posteriorly.
3. Divergence of fibers of external sphinc t er posteriorly.
4. The elliptical shape of anal canal.

So the causes of anal fissure are as follows :-

1. Passage of hard stool
2. Inflammatory bowel disease
3. Previous anal surgey when too much skin has been removed during surgey and anal stenosis has occurred.
4. Parturition
5. Persons taking laxatives or purgatives for long.
6. Trauma by nozzle of enema, speculum etc.
7. HIV, TB, STD, Syphilis, leukemia.

Bheda - Classification :-

Description of the classification accoding to the doshas is given in kshayap samhita only, in the chapter of Garbhini Chikitsa.

3 types of parikartika have been mentioned in Kshayapa samhita

1. Vatika 2. Paittika 3. Shleshmika

This classification is based mainly on the character of pain.

In modren scienc, for all purpose, fissure can be classified into 2 groups.....

1. Primary or idiorpathic 2. Secondary to other disease or surgery

Fissure can also be classified as

1. Acute 2. Chronic

Acute fissure :-

It is an ulcer, often a moere crack in the epithelia surface but may causes severe pain and spasm. It has a history of less han 6 weeks.

Chronic fissure :-

It has thickened margin, sentinel tag, hypertrophied papilla and its base has fibers of internal sphincter. It has a history of more than 6 weeks.

Pathology :-

The situation of fissure in vertical axis of anal canal and nearly always in posterior midline of anal canal is quite constant. It lies in cutaneous portion of anal lining between the level of anal valve and analorifice. In this portion, it is situated superficial of the lower most quarter or 1/3 rd of the internal sphincter. Initially, it is separated from sphincer by thin layer of longitudinal muscle spread on inner surface of later but eventually it may deepen down to the sphinceter so as to expose its circular fibers in its floor.

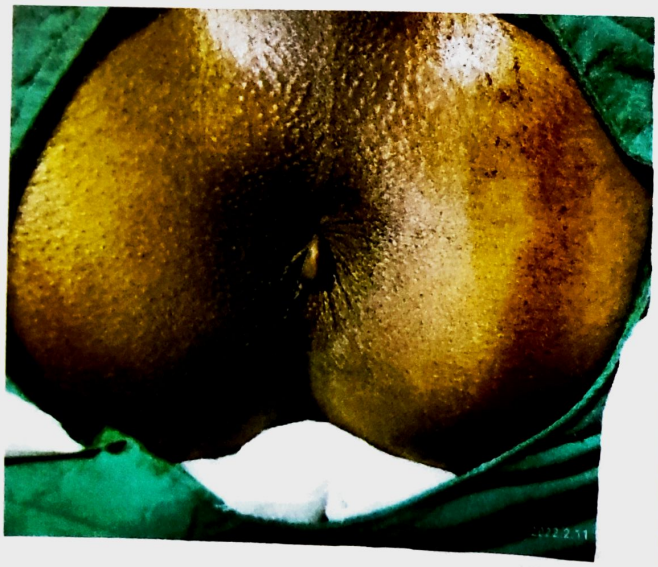
Goligher says that it bears no direct relation to external sphincter.

Miles (1919-1939) said that pale tissue exposed by a chronic fissure was not sphincter but a condensation of fibrous tissue in submucous space of anal canal forming a ring of fibrosis- pecten band.

The work of Eisenhammer (1953), Goligher, Leacock an Brossy (1955), and thomson (1956) leaves no doubt that the underlying tissue in fissure in internal sphincter and the structure identified as pecten band by Miles. is the prominent lower edge of this sphincter and the external sphincter is not is direct contact with fissure at any stage.

Secondary Changes :-

1. **Sentinel tag :-** The swelling of skin at lower end of fissure, actually at the level of anal orifice, so that it forms a tag like swelling called sentinal tag, due to low grade infection and lymphatic edema. After the tag has undergone very inflammed, tense and edematous appearance, it may go into fibrosis later on and persist as a permanent skin tag even after healing of fissure.
2. **Hypertrophied papilla :-** The anal valve immediately above the fissue form hypertophied anal papilla or polyp.
3. **In a long standing** case, the development of fibrous induration in the lateral edges of fissure.
4. **At any stage suppuration** may occur and form perianal abcess which may burst externally to form fistula. So, an anal fissure should always be thought of as the commonest cause of a median low dorsal fistula.



Kshar-Karma in the Case of chronic fissure - in Ano

Pathogenesis :-

According to Devis (1960) - Infectious material gain entrance to anal tissue and infection localizes superficially in subctuaneous space inviting dissolution of overlying anal skin. The resulting defect is an ulcer.

Nesselrod (1970) has given anal infection as the main cause of anal fissure which occurs in 3 stages:-

Stage I - The infectious material is trapped in one or more anal crypts and is carried to anal glands via anal ducts. Thus, the crypts serve as funnels via which infectious material from intestinal tract entersanal ducts and glands.

Stage II - It is initiated by invasion of surrounding tissues by infectious material. This can occur directly due to breaks in the continuity of gland or duct or indirectly via vascular and lymphatic supply.

Stage III - When infectious material localizes superficially in subcutaneous tissue of anal canal, usually posterior, a dissolution of anal skin reuslts in the formation of ulcer of anal skin known as anal fissure.

Rupam - (Clinical features) :-

The prodromal symptoms in the words of sushruta is, pain of sharp cutting nature in guda. Further he escribed in chapte vamana - Virechana vyapada, there is sort of cutting pain, sawing pain in anus, peins, umbilical egion and neck of urinary bladder. The emission of flatus is arrested, the vayu is incarcerated in abdomen, relish for he food vanishes.

Charak has fully suppported sushruta's description. He has described pain like cutting in guda and also pain groin, flanks and sacral area and during defacation, the prolapse of rectum and presence of faecolith.

Further he has quoted that the symptoms are pricking pain in sacrum, groins, below the naval area and ssage of scanty stools and constipation in patient suffering from parikartika.

Pain :-

Acute anal pain is associated with and following passage of stool. The pain starts with the act of defecation d is described as sharp, cutting or tearing which subsequently continues as a burning or gnawing discomfort for veral hours following stool.

During defecation the anal tissures are stretched and the margins of anal ulcer are separated. The first victim anal fissure is the anal skin of anal canal. The anal skin has somatic sensory nerve supply whichconveys the assage from surface of ulcer to spinal cord and the motor branch conveys motor signal from spinal cord to hincter muscle, thus the irritation engendered at the ulcer is conveyed to spinal cord thereby producing reflected fects on sphincters, leading to painful contractions which continues until the muscle becomes fatigued and at that ne patient feels relief. So the muscle spasm causes pain and fatigue results in relief.

Bleeding :- Usually slight but occasionally more profuse and may cause anaemia.

Swelling/sentinel tag :- A tag like sweling called sentinal tag is due to low grade infection and lymphtic edema. It seems to stand guard ass it is present at distal border of the lesion. Mahadeven says that sometimes an anal valve is torn down by scabulous mass resulting in fissure with a sentinel tag at its end.

Discharge and pruritus:- If there is much discharge it increases the moisture of perianal skin with resulting pruritus around the anus.

Urinary symptoms :- Some patients may develop disturbances of micturition by reflex mechaninsm and complain of dysuria or retention or increased frequency.

Bowel habit :- The patient makes out that pain is initiated or aggravated by defecation. So there is tendency to defer going to stool, thereby normal bowel habit is gradually taken over by constipation.

Nervous manifestaion :- There may be abdominal discomfort, digestive disturbances, headache, irritability and extreme nervousness and may be marked changes inthe personality.

Differential diagnosis :-

1. **Anal abrasion and pruritis with superficial cracks :-** Usually found in infants and children which heal easily under proper anal hygiene. In pruritus ani several cracks extending radially from anus are found. Both of these conditions are limited to superficial layer of skin and the characterisitc features of fissure such as spasm of sphincter are absent.
2. **Ulcerative colitis :-** In this, ulcers occur in large intestine and fiisure is its rectal manifestation which is very painful and deep and very septic so that readily lead to abscess and fistula formation. They are often situated in midline and may be multiple. Patient may hav diarrhoea and general disturbances also.
3. **Crohn's disease :-** Anal fissures found in it appear grosser than idiopathic fissures and more similar to that seen in ulcerative colitis bu more extensive. Histological examinationof the tissue confirms diagnosis.
4. **Coccydynia :-** There may be H/O injury of fracture of coccyx. which causes contraction of levator ani and coccydynia may be unknown etiology. Rectal examination reveals local tenderness and occasionally deformity.
5. **Ectropion :-** Growth of rectal mucosa distal to level of dentrate, where a portion of wall of canal becomes lined by rectal mucous membrane instead of anal skin and careful examination reveals smooth, velvety appearance of mucosa. There is no pain or spasm but constant mucoid discharge results in soggy, macerated anal and perianal skin.
6. **Proctalgia fugax :-** Intemittent cramp like pain in rectum, usually at night, is its characteerstic feature. It lasts only a few minutes and may follow sudden explosive bowel action of ejaculation. It is usually found in young patients suffering from anxiety or stress. It may be due to segmental cramp of puborectalis.
7. **Associated with carcinoma :-** Squamous cell carcinoma of anus, adenocarcionoma of rectum . In both, the anal skin is involved and shows fissures resembling chronic idiopatic fissures but there will be more induration, inguinal lymph nodes may become hard and enlarged. Histopatiholigicl examination confirms the diagnosis.
8. **Syphilis :-** Fissures due to syphilis may either be primary chancre or condyloma (Secondyar). A classic primary chancre is typically a single painless papule, which quickly erodes to form an ulcer with smooth base and firm raisd border. These ulcers are usually painless but there may be rectal pain, tenesmus, difficulty during defecation and rectal discharge. The presence of symmetrical lesions in either side of anal canal will raise suspicion.

   Anal condylomas affect anal orifice and perianal kin. The anal region and perianal skin. The anal region is moist and pruritic. The presence of multiple superficial ulcer should raise the possibility of syphilis. Secondary lesions and mucous patches are also present in mouth. The discharge from ulcer contain spirochetes. VDRL (Venereal diseas research laboratary) and TPHA (Treponema pallidum haemoagglutination test) are also used for diagnosis.
9. **TB :-** Rarely TB ulcer occur in anal area. Early stages may present with a simple fissure and late stage shows characteristic undermined edge. Histological examination confirms the diagnosis.
10. **HIV (Human immunodeficiency virus) :-** Recent studies shows that there is clear association between HIV positivity and ulcerative lesions. Therefore timely diagnosis and teatment is of paramount impotance. ELISA and western blot tests are available to detect HIV infection.

    Ano receptive intercourse and diarrhoea, illness predispose HIV patient to develop anal fissure characterized by persitstent gnawing pain, location above dentate line, broad base, deep invasion, a patulous anus and AIDS.

11. **Agranulocytic angina** - The anal lesions fail or respond to normal treatment and the blood study show decreased leucocyte cound and low percentage of granulocyte. Similar lesions can be found in mouth and throat.

12. **Gonorrhoea** :- The patient may have slightly erythematous rectal mucosa and small ulceration at anorectal junction. Diagnosis can be be made by culture of rectal exudates and biopsy.

13. **Chancroid** :- An erythematous tender papule develops at the side of inoculation and within a few days it becomes pustule and develops into a painful ulcer which have poorly demarcated border and characteristic necrotic irregular base covered by mucopurulent exudates. There may be painful inguinal laymphadenopathy. Culture from enlarge lymph node is diagnostic.

14. **Lymphogranuloma Venerum** :- Rectal involvement is manifested by rectal discharge and perirectal fistulae or abcess cryptitis. Progressive stricture can cause rectal stricture in untreated cases. Culture from lesions and enlarged lymph nodes confirm the diagnosis.

15. **Idiopathic stenosis of internal sphincter** :- In older patients, usually women accustomed to taking aperients over many years this condition occurs. Due to this the anal canal has for a long time been spared ofthe regular dilating action of a normal solid motion. As a consequence the internal sphincter undergoes contraction and may become fixed in this contracted condition by fibrosis. There may be no history of chronic or existing fissure and no other symptoms except difficultly in passing motions.

Complications :-

- Abscess
- Fistula-in-ano
- Sentinal tag
- Hypertrophied papilla
- Anal contracture

Diagnosis :- A typical H/O anal pain assoiciated with defaecation is the pathogonomic of anal fissure. The diagnosis is confirmed by demonstrating the anal ulcer. In long standing cases, a sentinel tag may be present. In chronic cases the triad of disease i.e. anal fissure, sentinel tag and hypertrophied anal papilla can be demonstrated. There may be spasm of anal sphincters with puckering of anus. Because of intense pain, digital examination of anal canal shall not be attempted.

Examination :- It is very difficult becasue of severe pain. Goligher says "It is necessary that one should display particular gentleness in the examination."

Inspection :- It is the most important step in examination for anal fissures. The findings of marked sphincter spasm with a suggestive history is strong presumptive evidence of existence of a fissure. The spasm can usually be overcome by gentle, determined lateral separation of edges of the anal orifice, by traction with the fingers placed close to either side of anus.

The first thing to be noted is sentinel tag, posteriorly or anteriorly, big or small. The fissure itself is traingular or pear shaped slit in the skin of anal margin just above the base of sentinel tag. The floor may consist of connective tissue or internal sphincter (pale transversely running fibres).

The superficial fissures are mere cracks in the wall of anal canal which may bleed on stretching. There may be acute inflammation with frank pus exuding from fissure.

Palpation and DRE :- It is not done usually as it is quite painful. By palpation, sphincter spasm is confirmed. The maximum tenderness is elicited when finger is placed on the fissure bed, induration of laterla edges of fissure indicating fibrosis. At the upper end of fissure, a hypertrophied anal papilla may be palpable.

Proctoscopy :- This is often impossible but in doubtful cases it may demonstrate other lesions also.

Sigmoidoscopy :- It is best performed with a narrow bore instrument, its main value being to exclude proctocolitis or crohn's lesion and rarely used to reveal unsuspected carcinoma.

Treatment :- An appropriate line of treatment should adopted for this condition, so that the patient suffers the least. Superficial fissures attended by a relatively short history of pain, heal spontaneously often in two or three weeks. In contrast to this, real chronic fissure are most resistant to any kind of conservative treatment. Therefore it is desirable to make an early decision as to whether a fissure is likely to heal under an expectantregimes or an operation will be mandatory.

The treatment can be divided into 4 parts :-

1. Conservative
2. Pharmacotherapy
   - (a) Phytotherapy
   - (b) Chemical - pharmacotherapy
3. Parasurgical
4. Surgical

(I) Conservative management (Non pharmacotherapy) -

(i) Anal hygiene

(ii) Sitz bath or hot packs

(iii) Avoidance of constipation

(a) Most important entity of conservative line of treatment i.e. Fibre rich diet.

(b) Mild aperients are usually required e.g. Erand Bhrist Haritaki etc.

(c) Oily preparations such as almond oil/liquid paraffin (Cremaffin) are especially suitable. They produce soft easily passed motion.

(d) By this the repeated anal trauma caused by passage of hard faeces can be avoided, many fissures heal rapidly without any other treatment. The use of aperient should be justified only and long term unjustified use should be avoided since they cause stenosis of internal sphincer.

- As the pain is due to sphincter spasm, rest of sphincter is essential as advised by Becon and strictly recommended by Gabriel.
- Small or medium size dilators of Thorlaksons's or St. Mark's Hospital style should be used Finger can be used. Disposable dilators are available.
- Endoscopic dilatation with less complication is done these days.

Pharmacotherapy :-

Phytotherapy :- Parikartika as disease has been considered very lightly by sushruta and other successive authors. They have described the treatment of parikartika in a very brief manner. Only Kashyapa has mentioned its management according to Doshic type of parikartika, but it is true that none `of them has described surgical management there by showing that there was no need for surgery as the disease was completely cured by the use of medicinal preparations only, and they were satisfied with management.

According to the use of medicines it is divided into two categories :-

1. Local 2. General

1. **Local Treatment :-**

This local treatment is nothing but only Basti Karma. Basties are prepared in Ghrita, Tail and milk with the help of other different drugs. Most of the durgs, which are used in Bastikarma are Vata-Shamak, Vrana sodhana - Ropak and Pitta Shamak. There are three types of basties described by Acharya Sushruta.

(i) Anuvasana basti (ii) Pichha basti (iii) Sheetal basti

Remedy consists in employing a pichha basti with Yastimadhu (Glycyrrhizia glabra) and sesamum pasted together and dissolved in clarified butter and honey. Patient should be kept (Ghrita) on anuvasana Basti, (in cases of Pitta - predominance) Basti shall be employed with the cream of clarified butter and if case is vata predominance with Tail cooked with yastimadhu.

Charaka has also advocated both types of medicines which have been advocated by the sushruta. He says sheetal basti consisting of drugs having madhura and Kashaya properties (Pichha and Anuvasana Basti) prepared with madhuyasti power and kwatha should be used. Further, he has given the advice for the administration of sheetal basti conststing of the milk prepared with sweet and cooling drugs and it has been mixed with liquorice (Bsti prepared with ral (Shorea robusta), Madhuyashti, Kamal (Nelumbo nucifera) Raswat (Berberis aristata) and mixed in milk. (C. Chi 7/56-87).)

2. General Treatment :-

The oral preparation have many-fold objectives. Some drugs are used to correct the gastrointestinal disorders and other are used as laxative and few more as to improve the digestion (Deepan, Pachan) as Hingwastak churan, Chitrakadi vati. They have advised drugs as the tridosha -Shamak. Sushruta has advised for cold water bath and milk for oral administration.

In this disease the main problem is that of constipation and pain only. If one corrects the sconstipation aprt of disease and alleviates the pain the disease may disappear to a great extent within few days. Pain due to vata and pitta vitiation and constipation due to two reasons, firstly is the habitual constipation and other is due to fear or pain & apprehension for the defaecation. Charaka has also written about the oral treatment in Parikartika and advised for only drinking milk with almond oil.

He has also advised to take amla dravya because it has the property of vata shamak and these also improves the digestion.

In kshayap samhita khilsthana - 10 the treatmetn has been given as per predominance of dosha.

1. **Vatika parikartika :-**

Brahati (Solanum indicum), Bael (Aegle marmelos) and Anant (Hemidesmus indicus) are used which all have the vata-shamak property.

2. **Pattika parikartika :-**

Madhuyasti, Hanspatti (Adiantum lunatum), Dhaniya (Coriandum sativaum), Madhu etc. These drugs ar useful for pitta shamana and has also property to correct abdominal trouble with laxative.

3. **Kaphaja Parikartika :-**

In this he has used the durgs which have the property of kapha - shamkak and vata shamak also as kantakari (Solanum surattense), Peepal (Ficus reigiosa), Gokshuru (Tribulus terrestris) and salt.

Further more he has given the treatment for person who is suffering frequently form parikartika. Mik treated with durgs which have madur rasa and mixed with honey, sugar, Til taila (Sesamum indicum) and madhuyasthi.

Chemical - Pharmacotherapy :-

(i) **Anaesthetic ointment :-** To lessen pain and relieve anal spasm local anesthetic agents (5% Lignocaine xylocaine ointment) can be applied.

- It should be applied before and after motion.
- It should be applied as further inside as possible in the anal canal, with the help of finger or anal dilator or cone shaped nozzle but it should not touch the perianal skin because it produces local dermatitis and pruritus.
- 10% Xylocaine (Lignocaine) gel/5% lignocaine ointment is the preparation of choice but its long term use causes dermatitis.

(ii) **Long acting local Anesthetics :-** Oil mixed injection (to delay the absorption of anesthetic agent) of anestetic agents was infiltrated around inferior rectal nerves, so as to block these nerves resulting in pain relief. 20-25 ml. of durg is used. Nupercaine and proctocaine etc are available. But sometimes these are irritating to the fissure and contamination is followed by sepsis and fistula formation.

(iii) **Analgesics/Muscle relaxant/Anti-stress :-**

- Oral analgesics and muscle relaxants give immeditate relief to the paitnet in agony but the pain re-appears when their plasma level goes down.
- They usually cause APD in already starving patinet and so shall always be used with antacids.

(iv) **Application of glyceryltrinitrate :-**

- It causes chemical sphincterotomy
- Nitric oxide is the neurotransmitter that induces relaxation of internal sphincter.
- Glyceryltrinitrat donates nitric acid when applied locally as 0.2% w/w and produces enouth relaxatin for faster healing.
- Improves blood flow to the area promoting healing.

It has associated side effect like severe headahce.

(v) **Nitroglycerin :-** It comes under organic nitrates. It caus vasodilatation of both arteries and veins. It is predominantly used in symptomatic relief of angina pectors The vasodilator effect is used rectally to enhance blood supply in fissure and help in healing of fissure in ano. The side effect are flushing & Headahce.

(vi) **Ca^{++} Channel blockers :-** as Diltiazam, Nifidipine. It works as smooth muscle relaxant. if applied to anal mucosa it causes relaxation of internal anal sphincter muscle, thus causes chemical sphincterotomy.

(vii) **Botulinum neurotoxin :-** Botulinum toxins inhibit the cholinergic transmission by inhibitory ach vesicle release process. This therapeutic sction is used in treating fissure in ano by paralyzing the internal sphincer in spasm.

(viii) **Hyperbaric oxygen :-** Oxygen at high pressure is termed as Hyperbaric oxygen. Increased oxygen tension is primary therapeutic goal. Even a small increae in Po2 in previously ischaemic areas may enhance the bactericidal activity of leucocyte and glycogenesis. Thus, repetitive brief exposures to hyperbaric oxygen are a useful adjunct in the treatment of chronic refractory osteomyelitis or cursh injury or for the maintenance of compromised skin or tissue graft of flaps & also in Cronic fissure-in-ano. It has bacteriostatic action.

Parasurgical :-

Technique of skhara sootra karma is chronic fissure-in-ano with sentinel tag :-

Poorva Karma :-

- Written informed consent of the patient and attendant is taken.
- Anti-tetanus prophylaxis is given.
- Xylocaine sensitivity test is done.
- Preparation of operative field done by means of cleaning, shaving and painting. First soap water given 12 hours prior to operation.
- Patient kept nil orally for 12 hours before operation.
- Another soap water enema given in the morning of operation day.
- Premedicationof the patient is done as and when required 1/2 hour before, after maintaining the IV line.

Pradhan Karma :- A lithotomy position is required to carry out the minimum invasive techniuqe - The kshara sootra karma to manage the patient of chronic fissure-in-ano with sentinel tag/Fissure abscess. Afterwards, the conventional rituals are observed to prepare the operative field by scrubbing, cleansing and painting with antiseptic solutions followed by draping of sterile linens.

Haemorrhoidal block- 1% lidocaine wth adrenaline HCl is given in the dose of 7mg/kg body weight in fan shaped direction about 1 cm below and above the anal orifice in midline using 21 G needle. Earlier lidocaine with adrenaline Hcl sensitivity test is done in each posted for kshara sootra karma.

Transcuatenous pudendal nerve block :- The ischial tuberosity is taken as the landmark to perform transcuatenous pudendal nerve block. The tuberosity is palpated subcutaneously through the buttock and 7.5cm long needle (21G) is introdued into the pudendal canal along the medial side of the tuberosity. The pudendal canal lies about 1 inch (2.5 cm) deep to the free surface of the ischial tuberoisty. The local anesthetic 5 ml or 1 % is then infiltrated around each side of the pudendal neve (Rt & Lt.).

Digital rectal examination is performed once again to exclude any spefific pathology. The proctosigmoido-scopy is also carried out, if it is required.

Intracanal packing is given to avoid soiling during operation.

Digital anal dilatation (stretching of the snal sphincters) :- A procedure similar to that descibed by Recaminer (1829)/Lord's procedure.

Technique :- With the patient in lithotomy position, the anus is forcible stretched by intorducing first both index finger and then index and middle fingers of both hands, which maintatin a firm distraction for three or four minutes. During this manoeuvere the forearms are fully pronatd so as to stretch particulary the posterior wall of the anal canal. Often a better stretch is obtained in male patients by using the saggital rather than the transverse plane as this avoids the fingers coming incontact with the ischial tuberosities. The problem does not arise in women, owing to their wider pelvis.

Revelation of the fissure :- After the digital anal dilatation the lubricated bivalve anal speculum is inserted into the anal canal and fissure is exposed.

Partial dorsal internal sphincterotomy :- For the easy execution of partial dorsal sphincterotomy two special instturments are essential a bivalve type of anal speculum and a long no-7 bard parker scalpel handle carrying a small No-10 blade.

Technique :- Bivalve anal speculum is inserted into the anal canal, exposing fissure on the posterior anal wall. Incision made through the fissure from just above the pectinate line to 0.5cm beyond the anal verge and is gradually deepend through the internal sphincter muscle fibres. Bleeding from the raw surface is controlled by the application of gauze swab soaked with feracrylum solution.

The internal sphinceric tissue plane between the internal and external sphincers has been reached, as indicated by the absence of transversely running muscle fibres bundle. Then the interior edge of the external sphincter is snicked.

Holding of the sentinel tag :- After stretching the anal sphincters and partial dorsal internal sphincterpotomy, the sentinel tag is boldly held with the help of allis tisue forceps. There after semiciruclar groove is made with blunt scissor at the base of sentinel tag, to facilitate the fixation of Kshara sootra there in.

Bifid method :- In case of conglomerated and large sentinel tag. it is bisected in two halves and subsequently dealt separatiely with kshara sootra by extending same incision given for sphinctertomy in mid of sentine tag.

Transfixation o the dissected tag is made by using the kshar sootra as a ligature on a round body 76mm cruved neddle to facilitate the ligation of the pedicale of the sentinel tag.

Moreover, for the purpose of trans fixation of kshara sootra in form of horizontal mattress suture can be also applied to entangel the whole part of the broad base of the tag otherwise simple transfixation with single bite of Kshar sootra as ligature is sufficient to deal the tag.

Ligation of sentinel tag is done at the demarcation made by semi circular groove, by tieing the Kshara sootra properly and snugly around the dissected tag.

After achieving the secured ligation, the excision of ligated sentinel tag is carried out about 5 mm distal to ligature knot to minimise the necrosed tissue and subsequent debris in turn to reduction of post operative infections.

Gauze soaked with jatyadi taila is placed inside the canal to safe guard the anal cnal from corrosive action of extra Kshara. One end of the anal packing given initially is withdrawn out for facilitating easy removal.

T-bandage is given to hold the lay on dressing in position.

Paschata Karma :-

- Simple non narcotic analgesics whenever requried.
- Intravenous fluid infusion is restricted to minimum (not more than 500ml) to avoid urinary retention
- Patients are orally allowed after 3 hrs of operation.
- Regular monitoring for haemorrhage is done without disturbing anal dressing.

Post operative care and prescription :-

- Dressing is removed next morning after ushnodaka avaghana with Daru Haridra Kashaya is given
- Frequent ushnodaka avaghana (sitz btha) every 6 hourly with Daru haridra Kashaya.
- Instillation of jatayadi tails into the anal canal with the help of No. 6 rubber catheter attached with a 5 ml of syringe.
- Triphala guggal - 2 tablets x BD
- Amalaki churna - 4 gm x BD
- Isphgol powder - 2 TSF x HS SOS
- ASD daily till discharge of the patinet with jatayadi taila.

Diet :- High fibrous diet, Light bland diet, greenleafy vegetables, milk, cream, curd, lassi etc. plenty water orally.

Surgery :-

The surgery is usually elective and done only after complete and through investigations of the patient as well as pathology. There are two aims to be achieved.

(i) Relaxation of internal sphincter muscle.

(ii) Avoidance of recollection of discharge in the wound.

Preoperative preparation :- Bowel preparation and part preparation.

Anesthesis - Spinal, deep general anesthesia with muscle relaxant.

Postition - Lithotomy of Lt. Lateral

Method :-

(1) **Stretching of the anal sphincters (Lord's procedure) :-**

Procedure :-

- Index finger of one hand is introduced in the anus followed by its counter part.
- The anus is forcible stretched
- Second fingers of both the hands are then introduced and are stretching is then maintained for 3-4 min.
- Stretching in saggital plane is more effective in males than lateral stretching where ischial tuberosities bound the limits. In females pelvis is larger so the problem does not arise.
- During the manoeure the fore-arms are fully pronated to stretch particularly the posterior wall of anal canal.

Effect :-

- Temporary paralysis of int. and ext. sphincter for days or weeks.
- There may be incontinence during the time.
- Sphincter fibers are torn
- Bruising with oedema
- Fissure is widely open

Result :-

- Pain is relieved
- Condition heals with great rapidity
- Early normalization
- Reduction in anal pressure
- The pain is instantly relieved

(a) **Techniques of lateral subcutaneous internal sphincterotomy :-**

- A bivalve speculum is introduced into the anal canal and rotated so that the handles lie to the patient's right and the blades are situated in front & behind.
- Instrumnet is than gently opened to a 2 finger breadths and left laterla wall of the anal canal and of rendering the lower margin of the internal sphincter in that sector taut and easily palpable.
- A Von Graefe cataract knife is introduced on the outer side of this muscle

- The piont of the blade is inserted through the perianal skin, immediaterly lateral ot the lower edge of the internal sphincter and passed vertically upwards in the intersphincteric plane till it is adjusted to lie at or just above the level of the pectinate line.
- By means of delicate strokes of the blade in the direction of the anal canal the lower half of the internal sphincter is then divide, care being exercised not to penertate the lining of the canal.
- Sentinel tag or fibrous polyp is excised simultaneoulsy or before the procedure.

Results :-

- Immediate relief of pain
- Faster healing of fissure
- Early convalescence
- Incontinency and soiling of underclothers with mucofeacal discharge are the main drawbacks.

2. Cryosurgery :-

- It is method of using sub-zero temperature for selective destruction of unwanted tissue.
- Liquid nitrogen with boiling point (-196°C) is the best agent yet and it ensures total cell death in the treated area.
- Cryoprobe slightly smaller than that of the size of lesion is applied firmly.
- Liquid N_2 is then passed through the probe for 3-4 seconds.
- Cryoprobe adheres to thewhite discolorated skin an surrounding ice.

Complication :-

- Perianal oedema, incontinence.

3. Excision of anal fissure (Gabriel's operation) :-

- Also known as dorsal fissurectomy. Popularized by Gabriel.
- Stretching of the anal canal, a broad triangular skin flap along with the sentinel tag and lesion is excised.
- Post operativge sitz bath, analgesics, antibiotics.
- Dilatiation.

Result :-

- The wound is large and takes about six weeks to heal.
- Incontainence may develop if more than 2/3 of the int. sphincer is cut.
- Wound infections may occur if proper care is not taken

4. Excision of anal fissure with immediate skin grafting :-

Hughes operation :-

- To shorten convelescence in Gabriel's method & expedite healing. An immediate aplit thickness skin graft to the wound is applied after excision of the fissure.
- Bowels are confined for 5-6 days.
- Results are good but procedure requires long hospital stay.

Division of internal anal sphincterResults :-

5.
- Internal sphincterotomy, also called Eisenhammore's procedure
- An incision is given in posterior midling,. a white fibrous band is reached which is the inferior border of the internal sphincter muscle.

This incision is extended uptp lower 1/2 of the internal sphincter and it is divided. Wound is left open to heal by granulation.

(b) **Technique of open posterior internal sphincterotomy**A bivalve speculum in position, exposing fissure on the posterior anal wall. Incision made through the fissure form just above the pectinate line to 0.5 cm beyond the anal verge. It is gradually

- Deepend through the internal sphincter muscle fibres.
- Anal skin tag at the lower end and hypertophied anal popilla at the upper end are excised.

Results :-

- Immediate relief of pain.
- With in average 17 days the healing of the wound is adequate for the patient to start his routine work.
- Incontinence and mucoid discharge are the two main drawbacks of the procedure.
- This condition allows traction sufficient to draw the frozen skin awya for underlying structures.
- Freezing is stopped when ti is judged to have spread adequateely is.e. 2-3 mm beyond the surrounding normal tissue.

Results :-

The fibrotic tissue and sentinel tag becomes blackish in color and necrosed and fall withing 4-5 days after cryosurgery. The wound heals gradually. There is much of post operative pain. Watery discharge is more.**Such a regimen is to be followed for 3 weeks.**

Table showing conditions for conservative and surgical treatments :-

Sr.No.	Condition for conservative treatment	Condition for surgical treatment
1.	Short and single history of pain termittent	Long and continues or in history of pain.
2.	No sentinel tag	Sentinel tag.
3.	No induration in the edges of fissure	Induration in the edges of fissure present
4.	Scar is superficial	Scar is deep.
5.	Fibers of int. sphincter not exposed	Fibers of int. sphincter exposed.
6.	Mild to moderate pain	Severe pain, in acute or chronic casesof fissure-in-ano.

In nut shell th objectives of all the treatment are :-

- Complete relaxation of internal sphincter.
- Oral pain medication before any anticipated bowel movement.
- Stool softener, bulk laxative or catharitics.
- Soothing ointments with anaesthetizing properties may be applied but with doubtful effect.
- Self dilation if and when possible.

परिसर्वतो भावेन कृन्ततीव चिन्नतीव वेदना। (ड. 38/16)

वैद्यातुरनिमित्तं वमनं विरेचनं च पंचदशधा व्यापद्यते।

सामान्यमुभयो: सावशेषौषधत्वं, जीर्णौषधत्वं, हीनदोशापहृतत्वं वातशूलं अयोगो, अतियोगो, जीवादानम्, आध्यामनं, परिकर्तिका, परिस्राव:, प्रवाहिका, हृदयोगपसरणं, विबन्ध: इति। (सु. चि. 34/3)

तत्र गुदनाभिमेढ्रबस्तिसिर:सु दाहं परिकर्तनमनिलसंगो वायुविष्टम्भो भक्तारूचिश्च भवति। (सु. चि. 34/16)

हस्वं दीर्घ तनु स्थूलं जीर्ण शिथिलबन्धनम्। पार्श्वच्छिद्रं तथा वक्रमष्टौ नैत्राणि वर्जयेत।।

अप्राप्तयतिगतिक्षोभकर्षणक्षणनस्त्रवा:। गतिर्जिहद्या तेषां दोषा यथाक्रमम्।। (च. सि. 5/4-5)

तत्र पिच्छाबस्तिर्यष्टीमधुककृष्णातिलकल्कमधुघृतयुक्त: शीतम्बुपरिषिक्तं चैनं पयसा भुक्तवन्तं घृतमण्डेन यष्टीमधुकासिद्धेन तैलेन वाऽनुवासयेत्।। (सु. चि. 34/16)

Chapter - 13

Application of kshara (Kshara Sootra) in Abscess and Infected wound

Abscess :-

In the classical literature of ayurveda, it is given that "Vidhateeti Vidradhi. This is known as vidradhi which has been correlated to an abscess by many authors. In modren medicine and abscess is said to be a collection of pus.

Types :-

6 Types of vidradhi mentioned int he ancient medicine :-

1. Vataja
2. Pittaja
3. Kaphaja
4. Raktaja
5. Sannipataja
6. Kshataja

As per presentation :-

1. Bahya vidradhi
2. Abhyantara vidradhi

Abhyantara vidradhi is again divided into 10 subtypes depending on the site.

1. Guda - Ano- rectal abscess
2. Vastimukha - Prostatic abscess
3. Nabhi - Umbilical abscess
4. Kukshi
5. Vankshan - Appendicular abscess
6. Vrikka - Pyonephrosis
7. Yakrit - Hepatic abscess
8. Pliha - Splenic abscess
9. Hridaya - Purulent pericarditis
10. Kloma - Pancreatic abscess

In surgical practice three varieties of abscess are there as :-

1. **Pyogenic abscess :-** It is the commonest variety. The organisms gain entery either directly through penetrating wound to form abscess by direct infection, local extension from adjacent focus of infection, lymphatics and blood stream.

Pathology :- The suppurative infection gradually leads to cell death and liquefaction. The resulting yellow fluid is called pus which contains living or dead bacteria and leucocyte. An abscess cavity is filled by pus and lined by a pyogenic membrane which contains dead tissue cells and a wall of granulation tissue. As the recovery starts, the pyogenic membrane is converted into fibrous tissue and the cavitey is covered by granulation tissue gradually.

Clinical Features :-

Rubor	Dolor	Calor	Tumor	Function lesia

Presence of pus - detected by elevated temperature, brawny induration or fluctuation depending on deep or superficial pus.

Treatment :-

Where there is pus let it out :-

So the basic principle is to drain the pus, sent it for culture and sensitivity and give proper antibiotic cover-age.

Technique for incision and drainage :-

Free or liberal incision :-

An incision is made on the most prominent and the most dependent part.

Hilton's method :-

Particularly employed in places having important structures e.g. groin, axilla, neck. After giving incision a pair of artery or sinus forceps is forced into the abscess cavity and its blades are gradually opened to extrude out the pus. The forceps is taken out with its jaws open.

Exploration :-

After giving incision a finger is inserted into the abscess cavity and all the locui are broken into one cavity for complete dreainage.

Counter-incision :-

When the most prominent part is not the most dependent part, complete dreainage of pus is not possible by a single incsision, so a counter incision is required at the most dependent part to facilitate drainage by gravity.

Drainage :-

A corrugated rubber drain can be used for the drainage of the cavity. Gauze is packed into the wound.

2. **Pyaemic abscess :-**

It is characterized by formation of secondary foci of suppuration in various parts of the body caused by the lodgement of septic emboli consisting of a clump of organisms, infected clot or vagitations, formed as a result of breaking up to an infected thrombus.

Clinical featurs :-

- Generally multiple in number.
- Commonly occur in sub-fascial plane.
- Signs of inflammation are not present
- Constitutional disturbances are tremendous with high fever, rigor, toxaemia.
- Such abscesses may occur in viscera and may lead to death.

Treatment :-

- Administer a suitable antibiotic parenterally as soon as possible after culture and sensitivity of pus.
- Drain the superficial abscess.
- Search for the primary focus.

3. **Cold abscess :-**

Classical signs of inflammation are missing.

It is almost always a sequel of tubercular infection anywhere in the body, commonly in the lymph nodes, bones and joints. Caseation of lymph nodes form the cold abscess. Brawny induration, edema, tenderness may be present only if it is associated with secondary infection.

Commonest sites :-

Neck and axilla, loin, side and back of the chest wall, near the ends of long bones and joints.

Treatment :-

- Anti-tubercular regimen
- Aspiration through most dependent and most prominent part.
- May require excision of affected group of lymph nodes.
- Never make and incision for the drainage of cold abscess as it invites secondary infection and forms a persistent sinus.

Guda vidradhi :-

It has been mentioned under the category of abhyantar vidradhi. When describing the clinical features acharya sushruta has mentioned that it leads to obstrucion of the vayu. According to the site mentioned it can be compared with anorectal abscess.

Anorectal abscess :-

Abscess around lower rectum and anal canal are taken under this heading. These are important as they often culminate into fistula in ano.

Causative organisms :-

E.Coli, Staphylococcus aureus, bacteroids. Streptococcus, B. Proteus

Classification :-

1. Perianal abscess :-

It arises from acute inflammation of the anal gland. The pus collects within the internal sphincter and gradually moves between the internal sphincter and conjoined longitudinal muscle to track down and become superficial in perianal area. It may arise form infection of a thrombosed external pile also.

Clinical Features :-

- Throbbing pain around anus which exaggerates during defaecation.
- Constitutional symptoms such as fever, headache.
- On inspection an angry lump may by seen at the anal margin.
- On palpation, a very tender cystic lump may be felt by the finger in anal canal just below the dentate line.

Sequelae :- If left untreated, it may rupture into anal canal. Rupture to the exterior causing fistula formation may pass laterally of form ischiorectal abscess.

2. Ischiorectal abscess :-

Causes :- Extension of anal gland inflammation laterally, infectin via blood or lymph, Penetrating injury causing direct infection, Extension from a pelvi-rectal abscess.

As the ischiorectla fossa is full of fat and poorly vascularised, so infection continues to spread and so involves the whole fossa. Still left untreated it spreads to fossa of opposite side also.

Clinical Features :-

- Acute pain by the side of the anus which excacerbates during defecation.
- Constitutional symptoms may be present.
- On examination, a tender brawny indurated swelling is seen and felt superficial to the ischiorectal fossa.

3. **Submucous abscess :-**

It is situated deep to the mucous membrane of anal canal above the dentate line.

Causes :- Anal gland infection or infection after sclerotherapy in haemorrhoids.

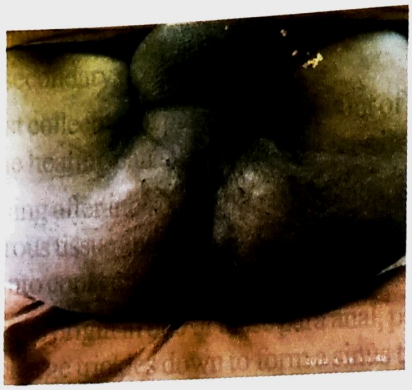
Treatment of all abscess described above is incision and drainage immediately under antibiotic coverage. A cruciate incision is given over the most prominent part of the swelling as inadequate incision may lead to fistula formation.

4. **Pelvi - rectal abscess :-**

It is situated above the levator ani and below the pelvic peritoneum.

Causes :- It is a simple pelvic abscess occurring form appendicitis, diverticulitis, salpingitis, parametritis or by extension of ischiorectal abscess.

Sequelae :- Burst into rectum leads to ischiorectal abscess



Various Presentations, Dipicting Peri- Anal, Ischio Rectal Abscess

Treatment :- Drainage through the fornix of vagina or through the anterior wall of the recturn. In short, incision and drainage is the treatment of choidce in a fully developed abscess. As mentioned in samhitas also. If the vidradhi does not resolve in 7 days then it leads to suppuration. At this stage incision has to be given to let the pus out.

In ayurvedic literature following mode of treatment is written :-

1. **Poultice :-** Application of paste or poultice made by different drugs depending on the doshaj predominance. e.g. Dashanga lepa.
2. **Swedana :-** It reduces the inflammation, increases the blood flow thereby increasing the clearance of toxins form the site but it is contraindicated in pittaja and raktaja vidradhi.
3. **Raktmokshan -** Blood letting.
4. **Patana karma** i.e. incision/drainage to let the pus out in the suppurated vidradhi.
5. **Shodhan and Ropana :-** Various yogas e.g. Jatyadi ghrita etc. are given in samhitas for the shodhan and ropan of the varana formed after drainage of the vidradhi by giving incision.
6. **Kshara karma :-** Kshara has got the properties of :-

Shodhan	(cleansing)
Ropana	(healing)
Shoshana	(absorbent)
Skandhan	(styptic)
Lekhana	

So because of these properties, kshara can be used in different manners for proper debridement and proper healing in the suppurated vidradhi. It can be used in from of paratisarniya kshara, as kshara varti and Kshara sootra placed or packed into the abscess cavity. Kshara varit or Kshara sootra will lead to the lekhan of the cavity alongwith shodhan and ropan as follows.

- Latex of snuhi (Euphorbia) - Proteolytic in nature , therefore dissolves fibrous tissue.
- Apamarga kshara - Alkali in nature which debrides the cavity and liquifies the thick pus, keeping the cavity clean via drainage of pus.
- Haridra powder - Anit-allergic, antiseptic, wound healer.

The effect of kshara sootra on Local Tissue :-

The kshara sootra or the varti applied cause early necrosis of the unhealthy tissue with active granulation along with capillary formation, fibroblastic proliferatnion and collagen formation leading to epithelial hyperplasia. Thus, leading to the healing.

Poorva karma (Pre-operative measures) :-

- Written consent of the patient is taken
- Xylocatine sensitivity is done.
- The patient is given prophylaxis against tetanus i.e. 0.5 ml of tetanus toxoid.
- The patient experiencing excessive anxiety may be administered an mild anxiolytic drug before the procedure.

Pradhana karma :-

- Place the patient in the appropriate position.
- Local anaesthesia can be used as per requirement.
- Prick the abscess with the help of a wide bore needle and syringe for the aspiration of pus and to make an opening or a port.
- Insert the piece of kshara sootra or varti through that opening.
- Apply the dressing.
- Alternatively a wick soaked in ksharodaka could be inserted through that port and then apply the dressing.

In case of Ano-rectal abscess following procedure should be applied :-

1. Anesthetise the patient.
2. In the lithotomy position, careful palpation of the swelling is carried out with index finger of one hand in rectum and other hand over external swelling.
3. A straight incison is made over the most prominent part of abscess, usually 3-4 cm from anal verge and gradually deepened until pus is obtained.
4. All loculi should be gently broken down with finger and extent of the cavity is explored.
5. As abscess most commonly extends towards the posterior midline, so extending the incision towards posterior- medial side via main prolongation of cavity.
6. Should there by any communication with the anal canal,a kshara sootra may be passed through and lossely tied.
7. Wound is dressed and T - Bandage is applied.

In case of Acute fistulous abscess and big cavity :-

- In this case the abscess is incised and drained.
- If fistulous tract contains a large cavity, kshara pichu is put inside the cavity. Insertion of pichu helps in proper drainage and debridement.
- After debridement, kshara sootra is applied.

Post operative care and prescription :-

- Dressing is removed next morning.
- Observe for the debridement kshara has done.
- Analgesics, if patient is not able to bear the pain.
- Again the same procedure is repeated as per requirement or the condition of the patient and abscess.
- Shigru guggulu - 2 tablets x TDS
- Amalaki churna - 5 grams x BD

Kshar Karma Indication After Incison and Drainage in Ischio Rectal Abscess

Post Procedure Management After Incison and Drainage in Ischio Rectal Abscess

Vrana :-

Vrana is the important disease in shalya tantra as Jwara in kaya chikitsa. All types of shalya and shastra karma results into vrana. The one who knows diagnosis, prognosis and management of vrana will be expert shalya chikitsaka. Such an expert in the management of vrana is called as vrana chintaka and vrankovida.

Definition of vrana :-

As the scar of a wound never disappears even after complete healing and as its imprint persists lifelong it is called vrana.

Definition :-

- Wound is a breach in the normal tissue continutity resulting in a variety of cellular and molecular sequel which may be accidental or a result of planned surgical intervention.
- It is a breakdown in the protective function of the skin, loss of continuity of the epithelium, with or without the loss of underlying connective tissue following injury to skin or underlying tissue/organ caused by surgery, blow, cut, chemicals, heat, cold, friction, presure or disease etc.

Risk population :-

- Elderly.
- Malnouished.
- Chronically ill or bed ridden.
- Under prolonged immunosuppressive drug therapy.
- Undergoing radiation therapy.
- Who had stroke or peripheral vascular disease.
- Diabetics.
- Obese.

Types of vrana :-

Agantuja vrana	Nija vrana
Chinna vrana (Excised wound)	Vataja vrana
Bhinna vrana (Punctured cavities/Stab wound)	Pittaja vrana
Viddha vrana (Punctured wound except in hollow organ)	Kaphaja vrana
Kshataja vrana (Lacerated wound)	Raktaja vrana
Pichchita vrana (Cursh injury)	Sannipataja vrana
Ghrista vrana (Abrasion)	

Chinnna vrana :- Extensive wounds, either oblique or straight, associated with separation of parts of the body.

Bhinna vrana :- Injury to the body cavities with the points of spears, lancet, sword or by horns etc., resulting in discharge (of body fluids or contents).

Viddha vrana :- The wound in which any part other than the body cavity gets pierced by a sharp pointed weapon, the foreign body in cases may remain either protruding out or may have gone out through it.

Kshataja vrana :- An irregular wound of the body, which netither exhibits the features of excessively excised, nor of excessively incised wounds but has the features of both.

Picchita vrana :- When due to a blow and pressure, a part of the body along with the bone gets flattened and is covered with marrow and blood.

Ghrista vrana :- When the skin gets peeled off due to a rubbing injury or any other such cause and is associated with burning sensation and discharge.

Nija vrana :-

- Doshas vitiated by respective causes along with dushyas will travel towards bahirmarga settle there and produce Nija vrana.
- Localised swelling is the purvarupa of vrana.
- Nija vranas are of sixteen types according to some acharyas, amongst which fifteen types are due to affliction of doshas including rakta and sixteenth is shudha vrana.

Classification of wounds :-

According to thickness/morphology :-

(a) Superficial (b) Partial thickness
(c) Full thickness (d) Deep and complicated

According to colour :-

(a) Red (b) Yellow (c) Black

Surgical classification :-

(a) Clean (b) Clean - contaminated
(c) Contaminated (d) Dirty/infected

Accoding to age of wound :-

(a) Fresh (b) Old

According to the complexity of the wound : -

(a) Simple (b) Compound/complex

According to the origin of the wound :-

(a) **Superficial** - It is a scrape, bruise, discoloration or swelling of minimal severity.

(b) **Incised** - Usually caused by sharp knife or glass. These wounds are relatively clean.

(c) **Crush :-** These wounds are commonly occurred following industrial, road traffic accidents and war injuries and removal of all the necrotic tissue is required.

(d) **Lacerated :-** Usually have jagged edges with certain lacerated and devitalized structure inside the wound.

(e) **Contused :-** It is blunt injury caused by heavy blunt object in which continuity of tissue is disrupted by tearing rather then clean cutting.

(f) **Stab :-** It is a incised wound that is deeper than side caused by forcing a pinted sharp edged instrument inside the body by a thrust.

Intentional and unintentional wounds :-

(a) Homicidal (b) Suicidal
(c) Surgical (d) Accidental

International red cross wound clasification system :-

It is a system where certain features of wound are scored and later the score can be graded according to severity, size of wound, here whether there is cavity, fracture or vital structure injured, the presence or absence of metallic foreign body.

A numeruical value is given to each feature (E, X, C, F. V. & M)

E = (Entry) centimeters - maximum diameter of teh entery.

X = (Exit) centimeters - Maximum diameter of the exit (X+ 0 if no exit)

C= (Cavity) - can the cavity of the wound take 2 fingers before surgery? (No-C=0, Yes - C =1)

F = (Fracture) - no fracture (F=0), simple fracture or insignificant comminutions (F = 1), clinically significant comminution (F=2)

V = (Vital structure) if injured (V=1), IF not (V=0)

M=(Metallic body) visible on x-ray-one metallic body (M=1), Multiple metallic bodies (M=2)

According to duration of the wounds :-

1. Acute wounds - closed and open
2. Chronic wounds

Infected wounds :-

The infection of the wound is the most common problem faced when dealing with the wounds. Even a clean wound may get infected later on, often due to the endogenous bacteria or form external contamination from the embeded foreign material.

Classical signs of infection :- Thses are

- Heat
- Redness
- Swelling
- Constant pain

Additional signs of infected wound are : -

- Increadsed exudate
- Delayed healing
- Contact bleeding
- Odour
- Abnormal granulation tissue.

Satges of nija vrana :-

Nija vrana passed through four stages namely,

- Dusta varan
- Shudha vrana
- Ruhyamana vrana
- Samyak rudha vrana

Shudha vrana :- The wound which is free from the three vitiated doshas, has bluish margins, even granulation tissure and has no pain or discharge.

Dusta vrana :- Ulcer having an excessively narrow or wide mouth, excessively indurated or soft ulcer, excessively elevatd or depressed, very cold or very hot, having any one of this colours black, red, yellow or white , fierce looking, full of pus and sloughing, vessels, ligaments, etc: assoiated with a discharge of putrifying pus, having tortuous tracks or multiple pockets: having an umpleasant appearance and smell with severe pain: burning sensation, suppuration, redness, itching, oedema and complicated with vesicles all around, excessive discharge are known as dust vrana.

Ruhyamana vrana :- Wound with pigeon colored margin without any discharge, which is non progressive and is surrounded by epithelium should be considered as a healing wound.

Samyak rudha varan :- The wound whose floor has healed up, which is not indurated any more, is not swollen or painful, is of the same colour and is at the same level as the skin should be considered to have healed properly .

Wound healing :-

It is the response of the body towards an injury, involving the interaciton of the cells and molecules resulting in compiled series of events that change the morphology and characteristic of the wounded area, in an attempt ot restore the structure and function near to normal.

Types of wound healing :-

1. **Category 1/primary healing/ healing by 1st intention :-**
   - Occurs within 24 hours of injury prior to the development of granulation tissue.
   - Indications -recent, clean tension free wound with viable tissue and achievable approximation and eversion of the skin margins.
   - Wound is closed by approximation of margins or graft or flap replacement.
2. **Category 2/delayed primary healing :-**
   - Occurs in contaminated wounds, where wound closure is delayed.
3. **Category 3secondary wound healing/healing by 2nd intension :-**
   - Occurs in full thicknes wound, resulting in intense inflammation.
   - Large quantity of granulation tissue formation
   - Pronounced wound contratction
4. **Category 4 :-**
   - Occurs especially in partial thickness wounds
   - The epithelisation process is predominant.

Phases of wound healing :-

The clinical staging of wound healing is :-

1. Latency phase - from day 1 to day 3.
2. Proliferation phase :- From the 4th day to 7th day.
3. Repair phase - from the 8th day.

When a wound occurs the body responds with a predictable series of events to repair the damage and this response can be divided into 3 distinct bio-chemical and histopathalogical phases :-

1. Initial phase :- Haemostasis
2. Catabolic phase :- Inflammation
3. Anabolic phase :- Repair, remodelling

1. **Haemostasis :-**
   - Takes seconds to hours.

     Platelet aggregation at damaged endothelium.
   - Generation of the platelet plug.

- Release of a number of signaling molecules e.g PGDF (platlet derived growth factor), TGF-b (Transforming growth factor) etc.
- Attraction of inflammatory and reparative cells.

2. **Inflammation :-**
   - Starts within 6 to 8 hours and continues upto 2 to 5 days.
   - Characterized by rubor, calor, dolor, tumor.
   - Secondary acidosis, tissue hypoxia,cell necrosis with mediation of mitogenic substance.
   - Acts to contain, neutralize or dilute the injury causing agent.
   - PMNs (polymorphonuclear neutrophils) are the first inflammatory cells recruited and arrive within 24 hours of injury.

3. **Repair :-**
   - Takes days to weeks, starts from 2nd day and continues upto 3 weeks.
   - Gain in tensile strength.
   - Characterised by increased cell proliferation, capillary budding and synthesis of ECM (Extra cellular matrix).

Involves 3 processes -

1. Granulation 2. Contraction 3. Epithelisation

4. **Remodelling :-**
   - Starts after 3rd week and continues for years.
   - Starts when collagen production equals degradation.
   - Principal cells are fibroblasts.
   - Major goal is to reduce excessive amount of ECM and align it through contraction and provide tensile strength to the wound.

Involves 3 changes :-

1. Soft friable collagen fibrils are converted to insoluble elastic fibres.
2. Embryonic active fibroblasts mature into adult resting fibrocytes.
3. Devascularistation.

The crucial factor for undisturbed wound healing is the maintenance of physiological partial pressure of oxygen in the tissue of wound area. Studies shows that the synthesis of collagen is stopped below acritical o2 tension.

It has also been proven that peak of oxygen consumption in the individual phase of wound healing correspond to the production of glycoproteins, proteoglycans and various collagen types. But ther is a brief physiological hypoxia" only in the early phase of healing which acts as a stimulus for mitogenic substances and without which angiogenesis is scanty. Hypoxia and hypovolemia both are risk factor for wound healing and infection.

In all stages of wound healing, normal oxygen tissue tension is a predilection for wound sterility and uncomplicated tissue repairs. On the other hand, oxygen deficiency leads to a disturbed high performance metabolism with overshot mechanism as scar or keloids.

If longer term hypoxia is present during the course of healing, the regeneration processes gradually come to halt. Tissue repair stagnates and a simultaneous wound infection leads to a reduction of O2 via the oxygen consuming phagocytosis. Consequently, the clearance function of phagocytic cells is exhauseted and devlopment of static and torpid wounds which sometimes persists over decades.

Wound assessment :-

A written record and picture of the progress of the wound - is a cumulative process of observation, data collection, and evaluation. As such, it;is an important component of patient care. A wound assessment includes a record of its initials assessment, ongoing changes, and treatment interventions. This initial assessment serves as the base line for future comparisons, with ongoing assessments occuring throughout the healing process.

Elements of a wounds assessment :-

1. Location and duration(Age)of wound
2. Wound size and stage
3. Wound measurement
4. Exudate and odour
5. Surrounding skin
6. Wound bed tissue
7. Draining Lymph nodes

Principles or management of vrana :-

Debridement is the removal of necrotic tissue, exudate, bacteria, and metabolic waste from a wound in order to improve or facilitate the healing process. Accumulation of necrotic tissue usually results from poor blood supply, a prolonged inflammatory process, bacterial damage, or an untreated cause of the wound (forexample, increased intersti tial presure, or other mechanical, chemical, or traumatic injury). In otherwise healthy people, natural debridement keeps pace with the accumulation of dying tissue in a wound. The removal of this tissue is necessary to reduce the biological burden of the wound in order to control and prevent wound infection, especially in deteriorating process.

Wound Debridement methods :-

Mechanical debridement :-

Methods of mechanical debridement include wet-to-dry dressings, hydrotherapy, and wound irrigation. Mechanical debridement may be more painful than other debridement methods all of the mechanical methods are nonselective: that is, they don't always discriminate between viable and nonviable tissue. Mechanical methods may be harmful to healthy granulation tissue on the surface of the wound and lead to bleeding, trauma, and disruption of the collegen matrix along with the necrotic tissue.

Sharp/surgical debridement :-

Sharp/surgical debridement includes the use of a scalpel, forceps, scissors, hydrosurgery devices, or LASER to remove dead tissue. Sharp debridement is considered as the 'gold standard' of debridement bymany clinicians. It can cause pain so a topical anesthetic, such as lidocaine cream or gels, may be required.

Enzymatic debridement :-

Enzymatic debridement is accomplished by applying topical enzymatic agents to devitalized tissue. These agents will digest and dissolve necrotic tissue in the wound bed through breaking down collage, elastin, and other parts of the abnormal devitalized wound martix. Enzymes that act on necrotic tissue are categorized as proteolytics, fibrinolytics, and collagenases, depending on the tissue component they target. Because papain urea enzymatic debriding agents target eschar, they are often used on wounds with necrosis. Collagenases target non-viable collagen tissue while sparing viable.

Autolytic debridement :-

Autolytic debridement use the body's endogenous enzymes to slowly remove necrotic tissue from the wound bed. In a moist wound, phagocytic cells and proteolytic enzymatic enzymes can soften and liquefy the necrotic tissue that is then digested by macrophages, Autolytic debridement can be facilitated withapropriate dressings in the superficial wound that contains little necrotic tissue, or a larger, deeper pressure ulcer. Underlying these concepts is a requirement of adequate circulation and nutrition.This method of debridement is contra indicated in infected wounds.

Maggot therapy (biological or larval therapy :-

In this type of debridement, several applications of sterilized medicine lucilia sericata (green bottle fly) maggots are intentionally introduced in the wound bed every 2nd to 3rd day. The specific application technique for how the maggots are actually introduced in the wound varies. in Some cases the maggots directly introduced into the wound so they can roam around (free-range) and other place the maggots contained in a device such as a pouch or tea bag-like sack. The mechanism by which maggot therapy works is believed to be by the enzymes the maggots secrete. These substancs are proteinases that degrade the necrotic tissue. The maggots also digest bacteria making them effective in wound with resistant bacterial strains. Maggots also accelrate wound healing simultaneously by stimulating granulation tissue.

Acharya sushruta has described 60 procedures for the management of vrana. They are as follows :-

1. Easily digestible - light nutritious food (apatarpana).
2. Application of paste (alepa) - as- Dashang lepa.
3. Spraying (pariseka) - as- triphala kwatha.
4. Anointing (abhyanga) - of sneha.
5. Fomentaion (sveda) - to reduce inflammation.
6. Gental massage (vimlapana) - by finger.
7. Application of poultice (upanaha) - by ushna dravya.
8. Induction of suppuration (pachana) - ans sumag.
9. Blood - letting (visravana)- by leech as in PVD.
10. Internal oleating (snehapana) - of Ghrita.
11. Medicated emesis (vamana) - by panchtikta ghrita.
12. Medicated - purgation (virechana) - by triphala kwatha.
13. Excision (chedana)- of swellings as cyst, lipoma.
14. Incision (bhedan)- of swellings lke abscess.
15. Bursting by medications (darana) - by kshara.
16. Scraping (lekhana) - by sharp instrument.
17. Probing (esana) - of fistulous tract.
18. Extraction (aharana) - of retained foreign body.
19. Drainage by puncturing (vyadhana visravana) - in hydrocele.
20. Suturing (sivana) - to approximate edges by thread.
21. Approximation of wound edges (sandhan)- by clipping etc.
22. Squeezing out (pidana) - as brak or root of picchila dravya, yava, godhuma etc.
23. Haemostaiss (shonitasthapana) - by pressure bandage, by ligating the vessel.
24. Cooling applications (nirvapana) - by sheetal dravya.
25. Warming application (utkarika) - by kakolyadi gana.
26. Medicinal debridement (kshaya) - Panchvalka kawatha.
27. External use of vicks (varit) - Kshara varit.
28. External use of pastes (Kalka) - of sodhana dravya.

29. External use of medicated ghritas (sarpi) as Jatyadi ghrita.
30. External use of oils (tails) - Jatyadi tails.
31. External use of thickened extracts (rasakriya) - as triphla.
32. Exernal use of dusting powder (avchurana) as Neomycin powder.
33. Fumigation of wound (vrana dhupana) - by infra - red ligh, bark of srivestak, sara etc.
34. Procedure for elevation (ursadana) - by Aswaganadha, apamarga etc.
35. Procedure for depressing (avsadana) as in case of hypergranulation by Cupric sulphate.
36. Softening procedure (mridu karma) - by vatghna dravya.
37. Hardening procedure (daruna karma) - by triphla, Lodhra, ral.
38. Application of caustic (kshara karma) as in dusht vrana.
39. Thermal cauteriztion (agni karma) - Cauterization of haemostasis.
40. Pigmentation procedure (krishna karma) - by salsardi gana.
41. Depigmentation procedrue (pandu karma) - by rohiniphal.
42. Restoration of normal skin color (pratisarana) - Egg shell, mulathi, Nirmali, Mukta shukti & gomutra.
43. Encouraging regrowth of hair (romsanjana) - Oil of Bhilawa, Snuhi.
44. Depilation (lomapaharana) - by Laser in pilonidal sinus.
45. Enema (basti karma)as Jatyadi taila basti.
46. Douching and irrigation (uttarbasti karma) - by Panchvalkal kwatha.
47. Bandaging (bandhan) - to cover the wound.
48. Covering by leaves (patradana) - to cove the wound.
49. Disinfection (Krimighna) - as antibiotics, Neem, shigru, rasanjana.
50. Restorative measures (brinhana) - Bala, Amalki, Shatavari.
51. shirovirechana - Teekshn dravya.
53. Nasal medication (nasya) - of sneha.
54. Gargling (kavaldharan) - of antiseptic solutions.
55. Fumigation (dhuma) - Method of sterlising the wound.
56. Internal use of honey (madhu) - for wound healing.
57. Intenal use of ghrita (sarpi) - as triphala ghrita.
58. Instumentation (yantra as to remove foreign body.
59. Dietary regimen (ahara) - Nutritive diet.
60. Protective measures (rakshavidhana) - By dhupan and pranayam mantra.

Management of Agantuja vrana :-

Immediate treatment :- In case of wound created by exogenous factor immediate treatment aims at pacifying the inflammation and managed as aggravated pitta. In recent traumatic wound astringent, sweet, cold and demulcent procedure are adopted for a week. Madhu - ghrita promotes the union. An oil processe withsnadal wood, padmaka (prunus cerasolides), lodhra (Symplocos racemosa), utpala (Nymphaea Nouchali), priyangu (Cllicarpa macrophylla), turmeric, madhuka (Glycrrhiza glabra) and milk is the best for wound healing.

Later stage treatment :- In later stage the management should be aimed at subsiding the vitiated doshas and the wound is managed as doshaj vrana.

General management of Agantuja vrana :-

In chinna, Bhinna, vidha and kshataja vrana there will be excesive bleeding which results into vata parkopa which produce sever pain. Hence vata shamana treatment is adopted. Irrigation of wound with snehas for local as well as systemic useis indicated.

Poultics of vesavara and krsara with sufficitent sneha is given. Sudation by dhanya method and oily paste is also indicated.

Oily enemas processed with vata pacifying drugs is indicated.

- In pichchita and ghrista vrana ther wil be less bleeding and pita prakopa is seen leading to burning sensation followed by suppuration. Hence pitta shamana treatment has to be adopted i.e. cold external application and irrigation is indicated.
- Chinna vrana - Re uniting of partially or competely excised part has to be tried.
- Bhinna vrana - Management according to involved ashaya based on exploration and nishkarnata antra pravesha.

Viddha vrana -

Shira viddha	
	Bala varti proyoga.
	Sneha varti prayoga.

- Kshataja vrana - Madhu, ghrita, taila abhyanga.
- Pichchita vrana - Bhagna sandhana vidhi.
- Ghrista vrana - Madhu, ghrita seka, avachurnana.

All agantuja varanas after seven days are to be treated on the principles or Nija vrana chikitsa.

Vrana chikitsa depending on the stage of vrana :-

Depending on the stage of vrana, acharya sushruta has recommend ed sixty procedures (Shasti upakaramas).

In an established vrana the principle of treatment involved is to replace the lost tissue which is termed as ropana. But before Ropana of a vrana one has to ensure whether the vrana is healthy or not.

To have healthy state of wound it has to under go shodhana process.

Many drugs have been mentioned for shodhana and ropana karma. Majority of drugs posess both shodhana and ropana properties. For shodhana and ropana karma specific drugs can be used in the different forms like kashaya, varti, kalka, ghrita, taila, rasakriya and avachurnana. In which form the durg is to be used will depend on the type of vrana and the drug being used.

So Shodhana and ropana play important role in vrana chiktisa.

Vrana Sodhana :-

- Aaragbadhadi gana :- Aaragbadh (Cassia fistula), Nimba (Azadirachta indica), Guduchi (Tinospora cordiforlia), etc.
- Arkadi gana) Arka (Calatropis procera), Alarka (Calatropis gigantia), Karanja (Pongamia Pinnata), Apamarga (Achyranthes aspera) etc.
- Sursadi gana - Surasa (Ocimum sanctum), kakmachi (Solanum nigrum), Vidanga (Embelia ribes), Nirgundi (Vitex nigundo) etc.
- Lakshadi gana - Laksha, haridra (Curcuma longa), Daruharidra (Berberis aristata) etc.

Vrana Ropana :-

- Priyangwadi gana :- Priyangu (Callicarpa macrophylla), Dhataki (Woodfordia fruticosa), Lodhra (Symplocos racemosa), etc.
- Ambsthadi gana - Patha (Cissampelos pareira), Madhuka etc.
- And Guduchi, Aswagandha (Withania somnifera), peepal (Ficus religiosa) etc.

Removal of slough :-

- Application of teekshna & ushna dravyas.
- Application of kshara or kshar varti or kshara sootra.
- Magatification
- Chedana karma by shastra.

Important formulations in vrana chikitsa :-

Internal medication :-

Ghrita :- Guggulu tiktaka ghrita

Guggulu Preparations :- Saptavimshathi guggulu, Saptanga guggulu, Triphala guggulu, Amrutadhi guggulu, Shigu guggulu.

Externa medications :-

Ghrita yoges :- Jatyadi ghrita, Gouradhya ghrita, Karanjadi ghrita, Yastimadhu ghrita

Taila yogas :- Doorvadhi tail, Vrana viropana tail, Vajraka tail

Kashayas :- Aragvadadhi, Surasadhi, Nyagrodadhi

Kshara karma :-

Acharya Sushruta has mentioned kshara karma in 60 upkrama given for wound management. Because of its properties, kshara is used in different manners for proper debridement and proper healing ofthe dusht vrana. It can be used in form of pratisarniya kshara, as kshara varti and kshara sootra placed or packed intothe infected wound. Kshara varti or the kshara sootra will lead to the lekhan of the infected wound along with shodhan and ropana.

The Effect of Kshara on Local Tissue :-

As per local drug delivery system is concerened, it is advocated that the drugs are directly delivered in local pathological tissue planes and the kshara and other materials exert effect on the tissue directly so that the chemical reactions take place which enhance the chance of degeneration and lysis of unwanted/unhealthy tissue. Subsequently, the tissue reaction taken place owing to caustic/irritant agents present in Kshara Sootra. The degeneration in the tissue leads to necrosis to form a gap that triggers to inflammatory process and the healing process in the end.

The kshara sootra or the varti applied cause early necrosis of the unhealthy tissue with active granulation along with capillary formation, fibroblastic proliferation and collagen for mation leading to epithelial hyperplasia. Thus, it thereby promotes the process of healthy healing.

So, in case of indurated, itching and chronic wound which are hard to clean and have raised granulation tissue, cleansing by the application of kshara should be done.

Acharya charka has also mentioned the importance of kshara karma. He has written in chapter 15 of chikitsa sthana that a physician should use kshara in cases where surgery or agni karma is not helpful keeping in mind doshas and the diseases.

Poorva karma (Preoperative measures) :-

- The patient is given prophylaxis against. Tetanus i.e. 0.5 ml of tetanus toxoid.
- The patient experiencing excessive anxiety may be administered an mild anxiolytic drug before the procedure.

Pradhana karma :-

- Place the patient in the appropriate position.
- Local anaesthesia can be used as per requirement.
- Irrigate the wound or cleaning the wound with Normal Saline.
- Use Kshar sootra or kshara varti/ksharodak soaked packing over infected wound.
- Alternatively dry kshara could also be sprinkled over the infected wound.
- Apply the dressing.

ost operative care and prescription :-

- Dressing is remove next morning.
- Again the same procedure is repeated as per requirement or the condition of the patienth wound, till it becomes a clean wound.

Shigru guggulu	-	2 tablets x TDS
Amalaki churna	-	5 grams BD

दुष्टरक्तातिमात्रत्वात् स वै शीघ्रं विदह्यते। ततः शीघ्रविदाहित्वाद्विद्रधीत्यभिधीयते।।(च. सू. 17/95)

त्वग्रक्तमांसमेदांसि प्रदूष्यस्थिसमाश्रिताः। दोषाः शोफं शनैर्घोरं जनयन्त्युछ्रिता भृशम्।।

महामूलं रूजावन्तं वृत्तं चाप्यथवाऽआयतम्। तमाहुर्विद्रधिं धीरा, विज्ञेयः स च षड्विधः।।(सु. नि. 9/4-5)

व्रणो द्विधा निजागन्तुदुष्टशुद्धविभेदतः। (वा. उ. 25/1)

श्वेतोऽव्रसन्नवत्मऽितिस्थूलवर्ण्याऽतिपिज्जरः। नीलश्यावोऽतिपिडको रक्तः कृष्णोऽतिपूतिकः।।

रोप्यः कुम्भी मुखश्चेति प्रदुष्टा द्वादश व्रणाः।।(च. चि. 25/24-25)

त्वङ्मांससिरास्नाद्धुव्वस्थिसन्धिकोष्ठमर्माणीयष्टौ व्रणवस्तूनि। (सु. सू. 22/3)

त्रिभिदोषैरश्नाक्रान्तः श्यावौष्ठः पिडकीसमः। अवेदनो निरास्त्रावो व्रणः शुद्ध इहोच्यते।। (सु. सू. 23/18)

तत्राति संवृतो दुष्टव्रणलिंङ्गानि। (सु. सू. 22/7)

तस्य व्रणस्य षष्टिरूपक्रम भवन्ति। तद्यथा अपतर्पणमालेपः परिषेकाऽङ्गानिं स्वेदो विम्लापनमुपनाहः पाचनं विस्त्रावणं स्नेहो वमनं विरेचनं छेदनं भेदनं दारणं लेखनमेषणमाहरणं व्यधनं विस्रावणं सीवनं सन्धानं पीडनं शेणितास्थापनं निर्वापणमुत्करिका कषायो वर्तिः कल्कः सर्पिस्तैलं रसक्रियाऽवचूर्णेनं व्रणधूपनमुत्सादनमवसादनं मृदुकर्म दारूणकर्म क्षारकर्मग्रिकर्म कृष्णकर्म पाण्डुकर्म प्रतिसारणं रोसेंजननं लोमहपाहरणं बस्ति कर्मोत्तर बस्तिर्म बन्ध पत्रादनं कृमिघ्नं बृहणं विषघ्नं शिरोविरेचनं नस्य कवलधारणं धूमोमधु सर्पिर्यन्त्रमाहारो रक्षाविधानमिति।(सु. चि. 1/8)

अल्पावशिष्टे कृमिभक्षिते च लिखेत्ततोऽग्निं विदधीत पश्चात्।। (सु. चि. 18/38)

आरग्बधमदनगोपधोण्टाकण्टकीकुटजपाठापटलामूर्वेन्द्रयवसप्तपर्णनिम्बकुरूण्टक गुडूचीचित्रकाशार्डष्टकरंज-द्वयपटोलकिराततिक्तकानि सुषवी चेति।(सु. चि. 38/16)

अर्कालर्ककरंजद्वयनागदन्तीमयूरकभार्गीरास्नेन्द्रपुष्पी क्षुद्रश्वेतामहाश्वेतावृश्चिकाल्यलवणस्तापसवृक्षश्चेति।।
(सु. सू. 38/6)

सुरसाश्वेतसुरसाफणिञ्झकार्जकभूस्तृणसुगन्धकसुमुखकालमालकासमर्दक्षवक खरपुष्पविडंग कटफलसुरसी-निगुण्डीकुलाहलोन्दुरूकर्णिका फंजीप्राचीनबलकाकमाच्यो विषमुष्टिकश्चेति।। (सु. सू. 38/18)

प्रियंगुसमंगाधातकी पुन्नागनागपुष्पचन्दनकुचन्दमोचरसरसांजन कुम्भीकस्त्रोतोंजनपद्यकेसरयोजनवल्ल्यो दीर्घमूला चेति।।
(सु. सू. 38/45)

अम्बष्ठाधातकीकुसुमसमंगाकट्वंगमधुकविल्वपेद्यिकासावररोध्रपलाशनन्दीवृक्षाः पद्यकेशराणि चेति।।
(सू. चि. 38/46)

□□□□

Chapter - 14

Kshara Sootra Application in Fistula in Ano

Etymological derivation :-

The term bhagandara has been formed by combination of two different words i.e. Bhaga + Darana. Bhag is a word derived from the root 'Bhaj' which includes perineum and 'Darana' i.e. destruction of the tissue.

Bhaga Pradesh include perineal and perianal region. The Bhag, guda and vasti including urogential pelvic organs, recum, anus and vicinity structure.

History :-

Acharya sushruta (1500-1000 BC) for the first time has explained in details the causative factors, signs and symptoms, classification and management of bhagandara, Hippocrates made first referece to surgical therapy for fistulous disease by using apolinose (a plain thread) in cases of fistula in ano. Engliesh surgeon John Arderen (1307-1390 AD) wrote treatise of fistula in ano and afterwards Clysters in 1376 described fistulotomy and use of seton, Sainio and Helsinki told male predominance in this disease. Great contribution was given by physician and surgeons such as Goodsall and Miles milligan and morgan, Thompson and lockhart mummery in late 19th and early 20th century by offering theories on pathogenesis and classification system for fistula in ano. In 1976 parks refined the classification system which is still in widespread use.

Definition :-

- A swelling occurring within two fingers around the anus, which is deep rooted and is accompanied with pain and fever is known as Bhagandara Pidika. (Sushruta)
- A swelling in the anal region which has mild pain and subsides quickly is known as pidika and it is different form bhagandara pidika.
- Acharya Charaka describes it as a painful pidika occurring near anal orifice when contaminated and not cared, turns in Bhagandara.
- According to Achary Vagbhatta pidika occurring in one or two fingers anal orifice due to deranged dosas and bursta either internal or external is known as Bhagandara.
- Based on the cardinal features Bhagandara is correlated with fistula-in-ano.
- Fistula in ano is a track lined by granulation tissue which opens deeply in the anal canal or rectum and superficially on the skin around the anus. **Bailey and Love**
- Fistula implies a chronic granulating track communicating two epithelial lined surfaces. These surfaces may be cutaneous or mucosal. **John Goligher**
- Fistula is an abnormal track leading from a mucous membrane to another mucous surface or to the skin. **Miller**

Causes :-

Aggravating factors :-

Non specific infeftion	-	Cryptoglandular origin - >90%
Specific infection	-	Tuberculosis, actinomycosis, Lymphogranuloma venerum.

Predisposing factors:-

Fissure-in-ano, an ulcer at the root of a pile mass, infected and inflamed condition of a crypt of morgagni, infection from a hair follicle or a sebaceous gland, an infected sweat haemorrhoidectomy, sclerotherapy, foreign body

Specific causes	-	Inflammatory bowel disease, pilonidal sinus.
Malignancy	-	Anal carcinoma, low rectal carcinoma, blood dyscarasiam, post Irradiation
Trauma	-	Penetrating injuries, episiotomy, Srurgery of prostate, instrumentation.

Pathogenesis of Fistula-in-ano : -

(i) Stage of infection
(ii) Stage of Burrowing
(iii) Stage of abscess formation
(iv) Stage of formation of secondary opening

Because of infection there is vast collection of pus and any amount of large incision is unable to allow this big cavity to collapse effectively so that the healing can take place as it does in a case of superficial abscess.

As the time passes during dressing after incison or after spontaneous bursting of the abscess, the cavity and the passage gradually get lined with fibrous tissue and chronic granulation tissue which then become responsible for non healing of these abscess resulting into constant flow of a purulent discharge through a narrow tubular passage.

Each fistula-in-ano should have its origin in one of these para anal, para rectal or inter sphincteric abscesses from where the collected purulent discharge trickles down to form a sinus tract. The course of the sinus is usually decided by space infected and the structure overlying or underlying this space.

The internal opening is often the primary opening and denotes the source of infection from which the fistula initially developed. During the course of its development the primary opening only in which case it is termed close and the purulent discharge flow out through the external opening only in which case it is termed as the blind external fistula. Similarly, a fistula can be blind internal also in which case the internal opeing remains patent and the external opening is absent. This is difficult condition for diagnosis and for treatment since it is not easy to locate and approach the internal opening without an external opening. Still furthter, there may be a condition in which both the opening of a fistula are situated inside the ano-rectal canal and the patient complains of a constant pus discharge through the anal orifice without any apparent localized abscess on the surface. Therefore, it is important to study all the possible permutations and combinations of a fistulous course which it may adopt in relation to the structures surrounding the ano rectal canal.

A case of sinus connected with a septic focus in the bones of that vicinity or in the spine or else in the small or large bowel. All these possiblities should be kept in mind while treating a case of fistula-in-ano.

Nesselrod holds the opinion that in majority of cases of fistula-in-ano and also of other ano-rectal disorders like piles or fissures etc. The primary source of infection lies in a traumatized crypt o Morgagni into which the infected faecal material can easily find and entry and can easily infect the underlying anal gland or glands to which this crypt is connected.

The number of ways in which the course of a fistula can be described depends upon its clinical presentation and the possible permutations and combination of the pathway adopted by a tract coming form a deeplyseated abscess cavity. There are a number of factors which influence and decide the course of a tract.

(a) Subcutaneous fistula
(b) Intra sphincteric
(c) Transphhpincteric
(d) Supra sphincteric
(e) Extra sphincteric

Classification of Fistula-in-ano :-

A number of authors have made significant contributions to the study of classification of Fistula-in-Ano. The Modern concept of Fistula-in-Ano is based on its anatomical landmarks. Acharya Sushruta (1500-1000 BC) has given well documnted clinical classification of Bhagandara.

'Milligan and Morgan's' (1934) classification is relative to the anal sphincters and in particularly to the ano-rectal ring. Ernest mile classified fistulae according one as the vertical disposition and the later one as the horizontal disposition.

Eisenhammer stressed the imporance of the intersphincteric plane both in pathogenesis and spread of fistulae. Steltzner's (1959) classification is base on the anatomical course of the fistulous track in relation to the internal and external sphincter and the levator ani muscles. Park modified this classification in 1976.

Over the years, many classification of Fistula-in-Ano have described. Some have been very simple but of no help in th treatment, while others have used terms which have different connotations to different surgeons. The aim of any such classification should be to help the surgeon in the operative cure of the disease.

This knowledge acts as a guide to the operative treatment and it is very important to know it.

Comparison of Classification of fistulae in Anal region :-

Milligan Morgan's (1934) and Goligher (1975)	**Park's (1976)**
Subcutaneous (5%)	Scarcely recongnized
Low anal (75%)	Low intersphincteric
High anal (8%)	Transphincteric
Anorectal (7%)	Transphincteric with high blind
Ischiorectal or Infralevator	infralevator extension
Pelvirectal or supralevator	Trans or Suprasphincteric with blind Supralevator extension.
Submucous (or high intramuscular) (5%)	Extrasphincteric

Frequencey of various anal fistulae :-

Reference	**Type of fistula**					
	Superficial (%)	Inter Sphincteric (%)	Trans Sphincteric (%)	Supra Sphincteric (%)	Extra Sphincteric (%)	Multiple and Complete (%)
Parks et al	-	45	30	20	5	-
Marks and Ritchie	16	54	21	3	3	3
Arnous et al	-	61.1	19.1	5.5	-	14.2

Classification of Fistula in Ano by Acharya Sushruta :-

Type of Fistula :-

(i) Shatponake - Fistula with multiple opening.

(ii) Ustragreeva- Curved fistula.

(iii) Parisharvi - Fistula with copious discharge.

(iv) Shambookavart - Circular fistula.

(v) Unmargi - Fistula formed due to trauma.

(vi) Parikshepi-horse-shoe shaped fistula.

(vii) Riju-Straight fistula.

(viii) Arshobhagandar-fistula associated with piles.

Milligan - Morgan in 1936 (In Relation to Anorectal Ring) :-

Subcutaneous	5%
Low anal	75%
High anal	8%
Anorectal	7%
Infralevator (Ischiorectal)	-
Supralevator (Pelvirectal)	-
Mucosal	-

Bailey & love divede fistulae in 2 groups according to whether their internal opening is below or above ano-rectal ring.

Low level fistulae- that open into anal canal below ano-rectal ring.

High llevel fistulae - that open into anal canal at or above the ano-rectal ring.

Subcutaneous fistula :- Fistulous tract form under the skin of the anal margin or the epithelial lining of anal canal is termed as sbcutaneous fistula.

Sub mucous fistula - A tract traversing its course under the mucous lining of the rectum and going upward from the dentate line is called a submucous fistula.

Low anal fistula - Fistulae having a tract entering the anal canal at the level of inte sphincteric line are termed as low anal fistulae. An infection originating form the base of fissure-in-ano is commonest cause.

High anal fistula - Main fistulous tract enters the anal canal at dentate line or immediately below the anorectal ring and tract lies deeper to the superficial or deep portion fo external sphincter.

It usually adopts a stright course if exists anteriorly, but in case it occupies the posterior quadrants, the tract is usually curved giving it the shape of semi horse shoe or horseshoe depending upon whether the tract is unilateral or bilateral.

Anorectal fistula :- Very rare fistulae, with tracks that extend above the level of ano- recteal righ thus lie opposite both the anal canal and the lower part of the recutm. Fistula has either an external opening alone, or, more usually, there is internal opening into the anal canal between the ano-rectal ring and anal orifice and commonly at pectinate line posteriorly.

Park's Classification (1976) :-

- Inter Sphincteric - 70%
- Trans Sphincteric - 25%
- Supra Sphincteric - 5%
- Extra Sphincteric - 1%

Intersphincteric Fistula :- The fistula directly tracks down to the anal margin and open in perianal space. (Low sphincteric fistula).

Rarely (high inter sphincteric fistula) tracks upward and open into rectum or lead to intermittent rectal wall abscess.

Trans sphincteric fistula :- The track traverses through the external sphincter to open into ischiorectal fossa form here it can open into perianal skin. Reraly it could from a T-type fistula with extension high in the ischio rectal fossa which could bed falt as an induration in the rectum on PR examination.

Supra Sphincteric fistula :- This type of fistule present as as the track up to the pubo rectalis muscle and then down and pass above all the sphincters.

Extra sphincteric fistula :- It traverses from the skin into fatty tissue to ischio rectal fossa than pierces the levator nai muscle to open into the recutm. The track lies outside all sphincters.

As it opens into rectum the high rectal pressure leads to mucus and faecal matter entering into thetract causing persistent fistula with recurrent infection.

Symptoms of fistula in ano :-

1. Discharge from and opening around the anus or per anum.
2. Blood or pus mixed stool.
3. Pain during defaecation.
4. Pruritus ani.
5. Fever.

Discharge :- Persistent sero-purulent discharge keeps the part always wet, irritate the skin and cause discomfort.

External Opening :- Frequently solitary exernal opening usually situated 3.5cm-4 cm of the anus, presenting as a small elevation with granulation tissue pouting form the mouth of the opening.

Pain :- Pain so long as the opening is large enough for the pus to escape, pain is not the symptom, but if the orifice is occluded, pain increases until the discharge erupts.

Induration - As a rule there is much induration of the skin and sub-cutaneous tissue around the fistula.

Examination of patient :- Before examining the patient, complete history must be taken. The examination shouled be done in a comfortable position with maximum exposure of the perineum. Lithotomy is the best position to access a case of fistula in ano, though it is bit uncomfortable.

History of the disease with respect to its onset, mode and duration, type of discharge, severity of pain, chronicity of the disease, bowel habit, associated disease like tuberculosis, D.M. colitis, urinary disease, cardiac disease etc. Should be taken.

Various Presentations, Depicting Scenarios of Fistula- In- Ano

Method of examination :-

General survey :- Patients should be looked for anemia, general built and any other systemic disease.

Systemic examintion :- This is an important aspect for planning the treatment & while addressing specific fistulae.

Local examinaton :- The examiner after taking routiene universal precautions clean the part with antiseptic lotion and provide a gentle fomentation either with soaked cotton wool or with a steaming apparatus (Nadi sweda yantra) from a suitable distance.

The most important part of the examining a case of fistula in ano is inspection. The examiner should observe the following points.

(a) Discolouration

(b) Swelling

(c) Scar marks of previous surgery

(d) Anal tags

(e) External opening - Number, position, distance from anal margin

(f) Pus discharge - Blood, Pus, Faeces, Gas, urine

Palpation :-

(a) Temperature (b) Tenderness

(c) Wall of the Sinus (d) Mobility

(e) Induration (f) Lump

Digital Examination :-

With in the lumen Growth	Obstruction
In the wall Ulcer Polyps Carcinoma Rectum	Internal opening Stricture of the Rectum
Outside the wall Anteriroly Prostate Base of the bladder Uterus Vagina	Seminal vesicel Rectovesical pouch Cervix
Laterally Ischio rectal fossa Lower end of ureter	Lateral wall of pelvis Internal iliac arteries
Posteriorly Hollow of sacrum Sacro coccygeal teratoma & coccyx	

Inspection of examining finger for - Faeces, Blood, Pus, Mucous.

Examination with probe :-

Location of fistula :-

- Towards rectum
- Towards Ischial tuberoisty

Character of Fistula :-

(i) Blind external (ii) Blind internal

(iii) Complete (iv) In-complete

(v) Bilateral (vi) Radial

(vii) Curved (viii) Straight

Identification of Intenal Opening :-

(i) Goodsall's rule is very important to assess the internal opening. It is explained as follows : Draw an imaginary transverse line through the central portion of the anus. An external opening anterior to this line indicates that tracks run directly to the internal opening in the same quadrant of anal canal. An external opening posterior to this line indicates that the track runs in a curved course to internal opening in posterior midline. An exception ot this rule is an external opening situated beyond a radium of 3.5 cms form the anus in anterior to the imaginary line. In this case track usualy curved and internal opening is situated posteriorly in the midline.

(ii) A cord like thing may by palpable on digital examination beneath the skin between secondary opening and anal wall.

(iii) Pressure applied on perianal tissues around the track with the proctoscope in situ, as drop of pus may appear at internal opening.

(iv) A flexible probe may be used through external opening to detect the internal opening.

Investigations :- The investigations should be aimed so as to fulfill the following objectives.

1. To assess the general conditon of the patient and to diagnosse the associated systemic diseases.
2. To find out the extent of fistula and possibly the causes of recurrences.

The following investigations are required :-

Blood examinaton :- Hb, TLC, DLC, ESR, FBS, B.Urea, S. Creatinine, B.T, C.T. Pelvis, radiological examination, CXR-PA, PLAIN X-Ray (K.U.B), X-Ray - Spine, Pelvis, Fistulography

CT Scan MRI

Other examinaton :-

Montoux test, Biopsy, pus culture sensitivity test.

Passings a probe into a low anal fistula and palpation of the point of probe in the anal canal.

Passing a probe into an ano-rectal fistula and palpation of the point of probe through the rectal wall above the ano-rectal ring.

Treatment :-

Principles of Management of Fistula-in-ano.

Management of Fistula-in-Ano is of 3 types.

Management :-

Non-pharmacotherapy	Pharmacotherapy	Para-surgical	Surgical
-	-	Setion application	Fistulotomy
-	-	Kshara sootra karma	Fistulectomy
-	-	Kshara varti karma	

1. **Non pharmacotherapy :-**

- Local hygiene of perianal and perineal regions.
- Nutritious diet.
- Sitz bath- by panchvalkal, nimbh, nirgundhi kwath etc.
- Anti septic dressing twice a day

2. **Pharmacotherapy (Phytotherapy) :-**

- Saptvishanti guggulu 2 TDS.
- Triphala guggulu 2 TDS
- Triphala churna 5 gm daily.

Parasurgical :-

Seton division :-

It was described by Hippocrates in the 5th centure B.C. His concepts are still applicable today forthe management of difficult fistula problems. Seton (from the latin seta, a bristle) is a very slendre thread of raw linen uniting it into five folds of the lenght of a span and wrapping them aroud with a horse hair. It is certainly the simplest of the methods available for the treatment of extrasphincteic fistula and probably produces results comparable to the more suitable approach, at last with respect to cure rates.

When a track crosses the sphincter at a high level, it is much safer not to divide all the muscle beneath the track. Only a portion of the muscle is cut and a seton is inserted. Seton materials vary from a non-absorbable silk to nylon, which are commonly used. Some surgeons prefer to use stainless steel wire and ,there by cutting through the muscle.

Part and Stitz (1976) have advocated the seton. It is left in situ for 6-8 weeks, but may be left in place for several months, if there is infection it can be removed without division of the contained muscle, Henley recommended on elastic seton, tightened at two or three weeks interval untill it divides the muscles. This slow division on scarring ensures preservation of sphincter function.

Advantages of Seton :-

- It provides way to internal opening and fistulous tract for a staged operation.
- It allows the surgeon to better delineate the amount of muscle beneath the fistulous track.
- It prevents accumulation ofpus in the track and allows for proper drainage.
- It is used ot divide the sphincter gradually.
- It is specially indicated in anteriorly situated fistulae with no puborectalis muscle (Henley 1978).
- When a seton is in place, the assessment of the relationship between the internal opening and puborectalis muscle is easy.
- Gabriel (1963) postulated that presence of a foreign body stimulates the inflammatory reaction producing more fibrosis to prevent retratction of sphincter after divsion.
- It is especially helpful indealing with high level fistulae, transphincteric and suprasphincteric fistula-in-ano.
- After seeing the adverse effects with the application of irritant chemicals, severe postoperative complications following the surgey over fistulous tracks, compelled the surgeons to discard the choice of operative management of fistula-in-ano. So, kshara sootra treatment became popular all over the world.

Kshara Sootra Karma

Indication :-

- Chronic Non specific fistulae

Contraindication :-

(a) Definite contraindications :-

- Osteomyelitis of pelvic bones
- Osteomyelitis of femur
- Tuberculosis of hip joint
- Tuberculosis of spine
- Intra-abdominal cold abscess
- Chronic/acute cold abscess
- Regional ileitis
- Pelvic abscess
- Intestinal and pelvic malignacies
- Veneral disease
- Strictures of urethra causing urethral sinses
- Crohn's disease

(b) Associated conditions :-

These are the fistulae where Kshara sootra can be applied but the treatment for the systemic condtions should also be instituted. These are :

- Tuberculosis
- Diabetes Mellitus
- Hypertension
- Ischaemic Heart Disease
- Neuropathic conditions e.g. paraplegia etc.
- Chronic amoebiasis
- Benign prostaitc Hypertorphy
- Anaemia
- Uraemia and C.R.F
- Urinary tract infection.

Procedure

Purva Karma :-

- Written and informed consent of patient and attendants is taken.
- The patient is given proctoclysis enema/peglac solution before the procedure for evacuating the rectum of faecal matter.
- The patient's perianal area is shaved off for hairs.

- A mild anxiolytic drug is given before the procedure.
- Tetanus prophylaxis is given as tetanus toxoid 0.5 ml i.m stat.
- Xylocaine sensitivity is done with a test dose.

Pradhana karma :-

The patient is made to lie in lithotomy position and thighs are made to relax.

The whole perianal area is painted with antiseptic solution and draped with sterile sheets.

Step 1 - Nadi swedan Karma :- The part is again quickly examined and a gentle soothing steam fomentation by a nadi swedana yantra is indicated for 3-5 minutes. This will not only clean the part butalso relax the sphincteric tone which will facilitate the application of kshara sootra. Digital anal dilatation is done to strecth the anal sphinctes.

Step 2 - Identification of primary (Internal) Opening :- An attempt is made to palpate the internal opening which is often marked by a small protrusion or by a dimple at dentate line. The primary opening can also be visualized by anal speculum which is more evident by the manipulation of the fistulous tract leading to exuding pus from the primary opening or hydrogen peroxide, povidone iodene or methylene blue dye irrigation is done through extenal opening to locate primary opening.

Step 3 - Curetting of tract :- Tract is curetted and tissue is sent for biopsy and culture.

Step 4 - Probing :- There are two methods of probing

(i) Retrograde (ii) Anti grade

Retrograde :- In this method a fine malleable curved probe is passed through internal opening and brought out through external opening. Probe with bearing a heandle on one end can facilitate the process.

Antegrade :- A fine malleable probe is then pssed through the external opening towards the anal cnal and them gaining entery through the internal opening. When the probe has passed through the internal opening, it is brought out through the anal canal and entire course of fistulous tract is explored.

A sharp bend of fistulous tract which is felt as a thick layer of tissue intervening between the finger and probe could not be adopted by metallic probe. For this a silve/lead wirs or plain rubber catheter of 3-4 size can also serve the purpose usefully. Becasue it can never pierce the rectal wall by creating a false track.

A retrograde probing from the internal opeing can also help in guiding the external probe.

If primary opening is really closed an the fistula is blind external, one should create a new internal opening on most prominent point in rectum. But in no case it should go above the dentate line and never above ano-rectal ring even if the fistulous cavity is felt at higher level.

In case of supralevator abscess and pelvi rectal type of fistulae, the track is always above the dentate line. But the primary sourc of infection in all these cases lies in a crypt of anal gland at ano-rectal junction.

Therefore it is not advisable to go above the dentate line. The left over part of cavity/tract above this level will drain by gravity with the presence of the thread and it will show spontaneous healing in due course of time.

The entire fistulous tract is used as a fulcurm, the tip of the probe is pulled downwards and the handle is pushed upwards, till the tip of the probe protrudes out.

Step 5 - Application of apolinose (a plain thread) :- Then eye of the probe is threaded with a plain thread and gently withdrawn so that entire tract of fistula is threaded by sootra.

Step 6 - Ligation of apolinose :- The two ends of thread are now snugly tied outside ano rectal canal. The knot tying some where on the surface between the fistulous opening and anal orifice.

Step 7 -Change of apolinose of Kshara sootra :- Apolinose is replaced by kshara sootra on the next day. Kshara coating must be stripped from the place which is involved in the knot. Kshara coating on the surface have no role to play except for producing some undesirable irritation so it is better to denude the external part of thread for sufficitent lenght. In initial few sittings, the loop should either be losse fitting or just fitting.

Change of Kshara sootra :-

It is done once in a week better on 7th day

- Kshara sootra is tied lateral or outer side of the older thread near previous knot.
- On the other side of Knot, therad is hold with artery forceps and older thread is cut in between the Knot and artery forceps.
- It is changed by withdrawing older thread outside the anus after cutting older thread kshara sootra is tied in the tract snugly.

The tie of the Kshara sootra should not be tight or loose but just approximated because tightly tied thread gives pain to the patient and loose tied thread don't enhance the cutting & debridement porperly.

- These procedrue generally do not required local or generla anaesthesia.
- Kshara sootra is changed till the whole tract is excised & debride with healing form lateral or both side. The thread comes out itself when whole tract cut & heals.

Key Points :-

- In previsously operated cases fibrous tissue contaning tract and scar tissue require tight tie.
- When granulation tissue apears on the surface of wound, presence of cavity inside is suspected and in such case kshara sootra is tied loose and kshar pitchu or vasti, is applied in the cavity.

Measurement of old thread :- Lenght of changed old thread is measured at each sitting for plotting on the proforma in the form of graph.For this Folder Formula shoule be used.

F- denotes :-

(i) Type of fistula i.e. L.A., A.R.

(ii) Type of bhagandara i.e., S.P., U.G., P.S.

O denotes :-

(i) Number of opening i.e. I, II, III.

(ii) Clock position of opening.

L denotes :-

Lenght of the thread obtained at the first change of kshara sootra.

D dentoes :-

Durationof the disease in year.

E denotes :-

(i) Earlier operation, if any.

(ii) Efficacy of kshara sootra treatment in terms of unit cutting time.

R- denotes :-

Recurrence of the disease after kshara sootra treatment as recorded during follow up period.

Paschata karma :-

(i) Anuvasana vasti (medicated oil enema) :- 3-5 ml of soothing oily preparation as anutaila. jatyadi tails etc is injected high into anal canal before deafecation. This should be done twice daily.

(ii) Usnodaka avgahana (sitz bath) :- Patient is advised to undertake hot water sitz bath twice daily for half an hour before deafecation.

(iii) Application of ghrita :- Application of medicated ghrita prepared with jasmine gauriculatum (jati). It is applied over the wound and rectum after sitz bath and cleaning the wound. Ropana shanshanka is the ghrita prepartion with honey and madhuyasthi, the medicated ghrita has great efficey in anti-biotic resistant septic wound of chronic nature.

(iv) T bandage :- After application of ghrita T-bandage shoule be applied.

Supportive treatment :-

Laxative :- Abhyarista four tea spoon full with equal amount of water after meals.

Purgative :- If laxative fails to give desire effects then purgatives ar used as panchsakara churna, satasakara churna 3-6 gm with luke warm water at bed time.

Anti inflammatory treatment :- As shigru gugglu, Saptavinshati guggulu, shodashanga guggulu, Trayodashanga guggulu, Kaishor guggulu, Rasanjanavati in appropriate dose.

For healing :- Ravi tandava ras (R.S.S) with praval bhasma in 0.5 gm quantity in 2-3 doses with honey.

Analgesic drugs :- Irrigation of the part with warm anu taila relive the pain. Godanti and apragala in combination with sanjivani popularly known as Godanti vati can be used.

Anti biotic :- Suitable antibiotic as per need and culture and antibiogram.

Vihara :- Patients are advised to avoid exercise intercourse, anger, supression of natural urges, tiding etc. for 1 year.

Follow up :-

The patient is advised to visit the surgeon weelky to asses the condition of the fistula.

Kshar- Sutra Karma in the Case of Chronic Fistula- In- Ano

Unit cutting time

It is an important parameter to assess the efficacy of the kshara sootra. In kshara sootra therapy cutting and healing go simultaneously. so whenever healing is delayed cutting is also suspended by keeping thread losse. so whenever cutting time is considered it always mean cutting and healing. The term "Unit Cutting time" or UCT represent the number of days required to cut 1 cm. This is calculated by dividing the total number of days taken by a fistula to heal by initial length of tract.

UCT = total number of days/initial lenght of the thread in cm.

Dressing after the procedure is complete

Surgical management :- The only form of treatment of an anal fistula that has an reliable prospect of cure is surgery. Presence of a symtomatic Fistula-in-ano is an indications for surgery, spontaneous healing of Fistula-in-ano is very rare. Neglected fistulae may result tn repeated abscesses and perisstent drainage. Very rarely, malignancey may occur on long standing fistula. Therefore, surgery should be recommended unless there are specific medical contraindications to anasestheisa.

(i) **Fistulotomy :-** It includes incision of the tract laying open followed by the curettage of underlying tissue. Recurrence occur due to remnants of abscess cavity, necrotic or fibrosed tissue.

(ii) **Fistulectomy :-** It involves the total excision of the track with surrounded unhealthy tissue. It causes very wide wound and it heals form top causing a tunnel and recurrence.

Goligher has described 5 main types of operations for Fistula-in-Ano :-

1. Laying open the fistula and allowing the wound to heal by granulation.
2. Laying open the fistula followed by immediate skin grafting.
3. Laying open the fistula, excision of the fistulous track and primary suture.
4. Conservative operation based on the acceptance of anal glandular infection as the prime cause of Fistula-in-Ano.
5. Destruction of fistula track by CO_2 laser beam.

All the operative techniques, however can be grouped under two broad categories namely, fistulotomy and fistulectomy

Surgical treatment described by Acharya sushruta :-

S.No.	Name of disease	Signs and symptoms	Management
1.	Shatponak	Multiple boil or ulcerations with opening wound and anal tear. Foul smell of faeces and urine according to discharge Aasarva clear mixed with flatus, excessive discharge, complicated wound discharges faeces, urine and semen	Operative procedures advised according to need. Incision like ardha langalak or langalak or sabatovadarka given
		Vedana or pain like beating.	Gothirthak incision followed by cutting and pricking agni or kshara Karm (cauterisation) advised.
		Wounds andsurrounding tissues looks like red blackish in colour	Conservative treatment to increases pachkagni. Swedan with medicated vepours. Local applications of medicated oil of mulehathi and other medicines

2.	Ustragreeva	Small everted boil like camel's neck	Adequate debriement with kshara after excision of tract. (chitwa)
		Foul smell	Cauterization with kshara (agnikarma is contra indicatied)
		Warm foul discharge when compl-icated discharges flatus, faeces, urine and semen	Washing with medicatd water (parisheka)
		Burning like kshara and agni	Medicated oil and ghee for healing and relief of pain.
3.	Parisravi	Raddish Whitishm hard, fixed, inflamed boil like aakriti	Laxatives and purgatives Operative procedurers excision of tract with incisions like kharjurpatraka, chandraradh, chandrachakara, suchimukhm, awangmukha, which ever suits followed by cauterization with kshara or agni karma in post operative period to avoid recur rence.
		No foul smell	Washing with medicated water (parisheka)
		Thick gummy whitish discharges when complicated flatus, faeces, urine and semen comes out from the wound	Warm medicated oil and ghee locally
		Itching, heaviness and other pains of sheleshma derangement Whitish or pale varna	Laxative, purgatives ant to increase panchakagni laghu aahar is advised. Children are not advised above treatment
4.	Shambukawarta	Like toe opening multiple boils	Conservative treatment with warm medi - cated oil, ghee and laxative etc. based on prominence of dosha.
		Mixed smell of all the doshas Multiple coloured pus discharge Burning, itching and cutting vedana multi coloured boil	
5.	Aagantuka	No external appearance	Operation for extraction of bone and cauterization or agnikarma with balck stone (jambhawostha)

		Putrified smell of blood and muscle, Pus full of debris and necrotic tissues, pain like vidradhi or abscess, reddish swelling inside rectum or anus	

Recent advancement in case of fistula in ano :-

1. **Fibrin glue :-**

Glues :-

- Occlusion of fistula tract with sealant prevents contamination of tract with stool, mucous blood & pus.
- Protein in sealant stimulate native tissue ingrowth and biological scaffolding.

Technical aspects :-

- Fibrinogen + thrombi are the two components.
- 1st component is solution for fibrinogen, factor XIII and bovine apoprotiens
- 2nd component - thrombin - thrombin + calcium (cofactor)
- Both components are in separate syringe
- Dual syringe applicater - deliver both to surgicl site (mixed at tip of applicator)
- Clot begins to organize withing seconds of mixture

Mode of action :- Stimulates the growth of fibroblasts and pluripotent endothelial cells into the fistula tract to seal it off.

- Using the fibronecting an collagen present in the mixture as matrix for the cells to integrate into these cells then lay collagen and extractellular matrix in the next stage of wound healing.

Injection technique :-

- A well lubricated ureteric catheter size 6 to 7 F (French unit) passed through the fistula tract and delivedred outside the anal canal.
- Stylet is taken out and the KTP laser fiber passed through the ureteric catheter which was then removed and the laser fiber withdrawn to just inside the anorectal mucosa and a wooden spatula is placed over the inner opening.
- The laser was set at 20 watts continuously and a steady pull of the fiber towards external opening is carried out for 20-30 seconds.
- Internal opening is closed with 2/0 vicryl suture under direct supervision.
- Fibrin glue inject through ext. opening an its inner opening is pressed by the index finger.

Adventages :-

- Simple procedure
- Minimal pain
- Less morbidity
- No risk of incontinence
- Excellent in long, complex fistulas
- Non-invasive
- Early recovery
- Can be used again after a failure
- Success rates 31-80%

Disadvantages :-

- Recurrences increase with time
- Inability to close intenal opening securely
- Ineffective in Short, wide tracts, Recto-vaginal fistulas
- High cost
- Glue should not be pushed out of fistula tract.

Lift technique (ligation of inter sphincteric fistula tract) :- It is a novel modified approach through the intersphincteric plane for the treatment of fistula-in-ano, known as Lift (ligation of inter sphincteric fistula tract) procedure. Lift procedure is based on secure closure of the internal opening and removel of infected crypotglandular tissue through the intersphincteric approach. Essential steps of the procedure include, incision at the intesphincteric groove, identification of the intersphincteric tract, ligation of intersphincteric tract close to the internal opening and removel of intersphincteric tract scraping out all granulatigon tisse in the rest of the fistulous tract, and suturing of the defect at the external sphincter muscle

Rediofrequency Abation of Fistula :-

- Fistulotomies using radio frequency ablation.
- Low fistula should be treated.
- When RFA compared with conventional recurrences are almost similar.
- Incontinence ot gas 4% vs 12 %
- RFA does not heal surrounding tissue.

Vaaft Technique (video assisted anal fistula treatment) :- This tecnique involves use of an endo-scope, i.e Fistuloscope and involves two stages. First the scope is introduced through external opening and internal opening is identified. This is the Diagnostic step. Then a suture (purse string) is taken around the intenal opening so as to close it snugly. A semicirucular stapler or linear stapler can be used also. Then the fistula tract is debrided with fistula brush and scrappings sent for HPE. A fibrin glue injected near the inner end (now closed) and coagulation of the whole wall is done with the electrode. Simultaneously, the scope is withdrawn and the therapeutic procedure is over.

- 3mm Fistuloscope inserted through external opening.
- Track is dilated with pressurized glyceine solution.
- With gradual left to right, up or down movements follow the track.
- Identify & reach the intenal opening.
- The whole track is coagulated with monopolar cautery cm by cm.
- Fistula pathway appears as charred filled with dark necrotic material.
- Necrotic material is removed under vision with fistula bursh.
- Few sutures applied to close the internal opening.
- Lift the internal opening with the helo of sutures like volcano/tent.

2. Long, complex fistulas
3. Recurrent fistulas
4. Horse-shoe fistulas.
5. Anterior radial fistulas

6. Crohn's disease.
7. Rectovaginal fistulas (Long term results awaited).
8. Low fistula when patient doesn't want pain, long hospitalization, delayed recovery and scarring.

Disadvantags/Complication :-

1. **Higher cost :-** The cost of the plug is on slightly higher sidewhich becomes a deterrent for a few.
2. **Chances of Failure :-** Though Anal fistula plug has high success rate, still it is not successful in some patients. But even in these patient (with recurrence), this procedure can be repeated without any harm/risk.
3. **Plug extrusion :-** The plug can be extruded in 10-20% of cases.
4. **Abscess formation :-** There can be abscess formation in 4-8%

Mucosal Advancement Flap :-

It is a treatment of choice in post obstetric and crypto-glandular recto-vaginal fistula. In prone jack knifeposition, fistulous track is first identify by probing. Then intra anal retractor is inserted. Mucosa surrounding the fistula, anterior aspect of anal canal in sunmucosal and intersphincteric plane is infiltrated with weak adrenaline solution. Internal sphincter is divided after giving a transverse incsion at or below the level of fistula. Now disssection is proceed in intersphincteric plane for 4-5 cms.

Lateral incision is given along the long axis of the anus on either side of fistula opening. Thus a flap containing mucosa, submucosa, and intersphinteric plane with a wide base and tepering apex having fistula is created. Fistula is then excised transversely in the lower part of flap. Any infection if present in intersphincteric plane is curetted. Mucosa and internal sphincter below the transverse incision, are dissected free. Direct anastomosis is made between apex of flap and cut anal canal and lateral margins are secured with interruped suture. In this method vaginal side of fistula is completely ignored unless there is sepsis, in which case local curettage ad excision is done.

(a) The fistula track is excised from the external opening to the intersphincteric plane.
(b) The flap incorporating the internal opening is raised slon with full thickness internal sphincter.
(c) The raised flap, with line marking the level of division to excise the internal opening.
(d) The advancement flap is sutured to a site distal to the excised internal opening.

Transvaginal Mucosal Advancement :-

Technique is more or less same as rectal mucosal advancement method. But it is quite troublesome because of far less lax tissue in vagina than anus. But in some case as after restorativ proctocolectomy or previous colo-anal anastomosis, there is so much scarring in anal canal so anal advancement is almost impossible an in these cases transvaginal advancement is more convenient.

Transsphincteric Mucosal Advancement :-

If an internal opening of rectal component of recto-vaginal fistula is not approachable, access maybe obtained using trans-sphincteric approach or by posterior rectotomy without division of sphincter in which later is preferred.

With patient in prone-jack knife position, a longitudinal incision is made slightly off the midline form the buttock down towards the anal margin. Upper part of incision is deepened, and lower part of coccyx is excised if necessary. Rectum is opened between stay suture and a rectal mucosal advancement flap is created inprevious manner and the defect is closed, the ano-rectotomy is then closed in layers. Closed suction drainage is advisable.

- A contour stapler or liner stapler is applied and the bas of volcano which completes mechanical cutting and suturing.

Final results is small scar at the site of internal opening.

Anal fistula plug :- Anal fistula plug is made up of sub mucosa of small intestine and is a highly sophisticated absorbable material which is absorbed/dissolved by the body in 6-8 weeks. This plug is placed and anchored int he fistula tract by a special technique and the internal opening is closed over it. It provides the scaffold over which body's collagen gest deposited and closes the fistula.

Advantages :-

Non-invasive :- The procedure involves no cutting, scareeign or distortion of anatomy at all.

Little pain :- The procedure is associated with comparatively littel pain as there in no cutting involved.

Early recovery :- Recovery is very fast and the patient can be back to work with in a short span.

Less morbidity :- There is no new wound formation and no extensivge post operative dressings are requrid.

Shrt Hospitalization :- The patient cab usually be discharged in 12-24 hours after the procedure.

Can be used again after a failure :- In case of a failure, the procedure can be repeated without any risk or drawback.

No Risk of Incontinence :- There is absolutely no risk of inconstinence even in high fistulas and complex fistulas. Somebody has remarked "For high fistula, AFP method is a boon sent directly form heavebn.

Biological closure :- This procedure is a biological closure of the fistula tract rather than a 'Mechanical' closure' as in advancement flap.

Minimal foreign body reaction :- Studies have shown that there is minimal foreign body reaction to ' the plug material.

Resistant to infection :- The plug is made up to special material which is resistant to infection. This factor helps as the plug has to be placed in an infected environment.

High Success rate :- Studies have shown the success rate of Anal fistula plug treatment to be in the range of 70-87%.

Procedure of Choice :- The anal Fistula plug is the treatment of choice in 1. Hith fistula

अपक्वा: पिडका पक्वास्तु भगन्दरा:।। (सु. नि. 4/4)

क्रिम्यस्थिसूक्ष्मक्षणनव्यवाय प्रवाहणान्युत्कटाश्चपृष्ठै:। गुदस्य पार्श्वे पिडका भृशर्तिं पक्वप्रभिन्नातु भगन्दर: स्यात्।। (च. चि. 12/96)

एषण्या गतिमन्विष्य क्षारसूत्रनुसारिणीभ्। सूची निदध्यागत्यन्ते तथोनम्यायु निर्हरेत्।। सूत्रस्यान्तं समानीय गाढं बन्धं समाचरेत्। तत: क्षारबलं वीक्ष्य सूत्रमन्यत् प्रवेशयेत्।। क्षाराक्तं मतिमान् वैद्यो यावत्रच्छिद्यते गति:। भगन्दरेऽप्येष विधि: कार्योवैद्येन जानता:।। विरेचनं चैषणपाटनं च विशुद्धमार्गस्य च तैलदाह:। स्यात् क्षारसूत्रेण सुपाचितेनछिन्नस्य चास्य व्रणवद्धिचिकित्सा।। (च. चि. 12/97)

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Chapter - 15
Application of Kshara Sootra in Pilonidal Sinus

Introduction -

Acharya sushruta, father of surgery has given the description in details regarding the nadi or sinus in the chapter of "Visarpa nadi stanargoa nidana" 10th chapter of sushruta samhita nidana sthana. He recommended that if inflammatory swelling is ignored even during the stage of suppuration then it may result in chronic granulating tract, termed as 'Nadi' which is likened to test tube. In which the exudative material remains in movement there in.

Moreover, if such suppurative swelling is neglected and not managed properly by shalya karma in good time, will be responsible for an persistence of chronic nadi (sinus).

In addition Acharya sushruta has advocated that any retained or hidden foreign body in such chronic granulation treact of discharging nature will also be responsible for persistence of (sinus) nadi.

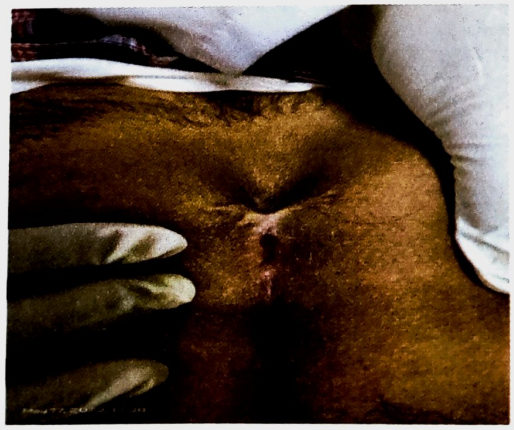
Nadi vrana is broadly of two types :-

1. Doshaj (Acquired)
2. Agantuja (Traumatic)

Pilonidal Sinus :-

The term pilonidal sinus describes a condition found in the natal cleft overlying the coccyx consisting of one or more, usually non infected, midiine opeining which are communicated with a fibrous track lined by granulation tissue and containing haris lying loosly within the lumen.

It was first described by anderson in 1847. The term pilonidal sinus is given by Hejis in 1880. The conditon seems to have incidence greatly in frequency in Anglo american services personnel during the second would war. Many of these individuals had done a fair amount of traveling in jeeps which led some writers to refer to pilonidal sinus as jeep disease.



Scenario of Pilonidal Sinus

Other sites of pilonidal sinus formation -

For many years pilonidal was though to be a lesion confined to post anal region. This is also found in hand, axillae,perineum, umbilicus and suprapubic region.

Aetiology and pathology :-

Although acquired theories of development are better accepted than the more historical congential theories, exact mechanism of development are speculative. Evidence that support the acquired theory of origin of pilondial sinu can be summarized as follows :-

- Interdigital pilonidal sinus is an occupational disease of hair dresser within the interdigital cleft or clefts. Pilonidal sinuses of the axilla and umbilicus have also been reported.
- The age incidence of appearance of pilonidal sinus (82% occur betwen the age of 20 and 29 years) varies with age of onset of congenital lesions.
- Hair follicles have almost never been demonstrated in the walls of the sinus.
- The hairs projecting from the sinus are dead hairs with their pointed ends directed towards the blind end of the sinus.
- The disease mostly affects men in particularly hairy men.
- Recurrence is common even though adequate excision of the track is carried out.
- It is thought that the combination of buttock friction and shearing forces in that area allows shed hair or borken hairs which have collected there to drill through the midline skin, or that infection in relation to a hair folicle allows hair to enter the skin by the suction created by movement of buttocks, so creating a subcutaneous, chronically infected midiline track. From this primary sinus, seconday tracks may spread laterally which may emerge at the skin as granulation tissue lined discharging openings. Usually but not invariable the sinus runs cephallad.

Clinial features :-

This condition is seen much more frequently in men than women, usually after puberty and before fourth decade of life and is characteristically seen in dark haried individuals rather than those with softer blonde hair.

A post anal pilondal sinus seldom presents itself till infection has supervened. A typical history is that a young adult develop an abscess at the base of spine which bursts or is opened by doctor. The discharge then ceases after a few days, though a nodule of induration may persist for a week or year. The paitent remains well for several weeks or months till another abscess occurs and the same course is repeated. He may have several recurring abscesses in this way before the condition is correctly disagnosed.

The primary sinus may have one or many openings all of which are strictly in midline between the level of sacrococcygeal joint and the tip of coccyx.

On examination, the findings in the postanal region are very characteristics. Situated accurately in the midlin some 5 cm or so behind the anus there is an opening or a series of opening placed close together or spread out over a distance of 2-3 cms.

Primary track -

This is common in the stain line corifice and extends in a subcutaneous tissue in a headward direction for a distance of 2-5 cm

Hairs :-

Projecting from sinus opening or lying in the primary track.

Diagnostic triad for pilonidal sinus -

It is made by diagnostic triad.

1. History taking
2. Physical examinaton
3. Supportive investigations in relation to pilonidal sinus.

1. History taking :-

Pilonidal sinus was common among jeep riders in the 1935-45 war. That's why it became known as 'jeep bottom.'

(a) **Age** - 82% pilonidal sinus patients are between the age of 20 and 29 years.

(b) **Sex** - In hairy males incidence of pilonidal sinus is quite common (male : female is 4 : 1).

(c) **Occupation** - Hair dressers mostly suffer from interdigital pilonidal sinus.

(d) **History of repeated abscess in sacro** - Coccygeal region.

2. Physical examination :-

Local examination -

(a) Inspection :-

- Visible sinus tract or pits in the sacro-coccygeal region
- Visible tuft of hairs in the opening.
- Swelling in sacro coocygeal region.
- Inflammation

(b) Palpation :-

- Tenderness will be present.
- It can be palpated as an area of deep induration beneath the skin in sacro coccygeal region containing tracts.

(c) Probing :-

- Probing helps in determining the branching of the tract i.e. if there are one, two otherwise multiple openings, relation if any to the neighbouring bones e.g. sacrum or coccyx.
- The direction of tract is determined with probing and extent or track, position of internal opening.
- The relation of the internal opening to the sacro coccygeal region is also found.

3. Supportive investigations :-

(i) X-ray lumbo sacral spine - to rule out any spinal abnormality.

(ii) Sinogram - to detect the path of sinus and its tract.

(iii) Pus culture and sensitiveity test

(iv) Biopsy - to rule out any malignant growth

Diagnosis :-

The diagnosis is confirmed by observing the typical skin lined sinus opening in the midline of postanal region often with secondary opening higher upon one or other side.

Treatment :-

(i) Non pharmacotherapy (ii) Pharmacotherapy

(iii) Parasurgical (iv) Surgical procedure

1. **Non pharmacotherapy :-**

(a) Aahar (b) Vihar

(a) **Aahar :-**

(i) Nidana parivarjana - The aetiological factors of nadivrana must be avoided.

(ii) Saktu (paste of flour), vilepi (thick gruel), kulmash (cooked pulses) should be consumed.

(iii) Balamulaka (Raddhish), karavellak (Bittergourd), dadima (Pomegranate), Amalaka (goose berry) fried in ghrita added with saindhav lavan.

(iv) Little quantity of porridge prepared form old rice helps in quick healing of vrana.

(b) **Vihara :-**

(i) To avoid ecessive sitting or long driving.

(ii) To maintain proper hygiene of natal cleft area which include shaving of hairs of natla cleft.

(c) **Sitz bath :-**

It mainly reduces pain which occurs after kshara sootra ligation and reduces inflammation (hot fomentation).

2. **Pharmacotherapy :-**

(a) **Phytotherapeutic drug :-**

- Drugs used for pana.
- Khadiradi kwath (Y.R. and B.R. 51/3).
- Trikatu, vacha, hingu, panchlavan, powde of ajawayan with kultha. (Su. Chi. 81/38).
- Guggulu - Navkarshika guggulu (Y.R. Ckd. Shi and B.R. 51/28).
- Saptavinshati guggulu (Y.R. Ckd. Chi and B.R. 51/29).
- Drugs which helps is shodhana and ropana of wound :-
- Jyotishmti (Celastrus panniculatus), Langali (glorisa superba), Danti (Baliospermum montanum), Trivrita (Operculina turpenthum), Kushtah (Sassuraeal lappa), Talvak (Symplocus racemosa), Kshiri varga. (Su. Chi. 8/39)

(b) **Chemical therapeutic durgs :-**

- Appropriate antibiotic
- Anti-infammatory drugs

2. **Parasurgical :-**

These methods aid to surgical procedure as

1. Kshara karma (chemical cauterization)
2. Agni karma (cauterization)
3. Varti (medicated wick)

Agnikarma :-

Cauterization is better than caustic alkalies application becauses it rule out disease by burning, thus preventing them from recurring.

Agnikaram is applied by heated shalaka made up of different metals having suitable lenght, thickness and shape.

Laser epilation in case of pilo-nidal is also used for the pilation of thick hair in the natal cleft.

Kshara karma :-

It does the chemical cauterization of tract and has some role in preventing the recurrence of disease by debriding and healing the wound with healthy granulation tissue.

Poorva Karma :-

- Informed and written consent is obtained.
- Preparation of the part is done by shaving and painting.
- Tetanus prophylaxis is given.
- Xylocaine sensitivity is done.
- Enema is given to clear the bowel.

Premedication :-

Injection Promethazine hcl is given half an hour before the procedure to calm down the patient i.e. sedation without depression.

Position :-

The procedure is done in lying position and or this, two positions have been given in the texts

- Prone position with the saccrococcygeal region elevated by pillow or angulation of the table. It is also known as the jack Knife position.
- Left lateral position, with the buttocks projectin slightly beyond the edge of the table.

Operative field preparatation and draping :-

The skin is prepared by painting with iodine chlorhexidine or some other skin antiseptic and a gauze pieces or cotton woiol soaked in alcoholic solution of chlorhexidine is placed over the anus to minimize the risk of contamination from this source during the operation.

Draping with sterile linens is then done, care being taken to the skin immediately behind the anus as a further precaution against sepsis. The assistant stands on the opposite side of the table and by firm traction with the fingers of both hands elevate the uppermost butock and rendering the internal skin tense.

If the patient is in prone position then adhesive tape is applied on the lateral part of the buttocks and by stretching the buttocks, tape is fixed with the table on the other end so that the skin is stretched.

Anaesthesia :-

This procedure is most comveniently performed under GA. It can also be done under local anaesthesia with lignocaine with adrenaline 4-7 mg/kg body weight. In this study local anaesteisa is preferred with infiltration of anaesthesia around the sinus in different planes deep upto the natal cleft.

Procedure :-

Remove the visible hairs first and also remove the debris with pus from the sinus to make it ready of probing.

Step - I - Probing :-

Methylene blue dye is injected through the external openings to stain the sinus tracks and its offshotts. Probing of the sinus is done to locate the track and its branches. Care must be taken not to create a false tract. A pin pointed director is now introduced through the external opening deep upto the saccrococygeal cleft or wherever the probe negotiates without much hindrance.

Step - II Widening of the opening :-

Now the external opening is widened with the help of artery forceps in the direction of the probe. Widening is done enouth so that one can visualize well into the sinus. Visualized hairs/trichobezoars are removed.

Step - III - Curettage :-

Unhealthy granulation tissue along with the impacted hairs is curetted well with a volkmann's spoon.

Step - IV - Trimming of the edges :-

Trimming of the edges of the wound is done to promote proper drainage and subsequent healing.

Step - V- Application of kshara sootra :-

The kshara sootra application is done through the sinus tract deep into the natal cleft and taken out through the secondary opening, if present or external opening is made in the dependent part where pus collection is expected. The kshara sootra is taken out throught that opening and a loose ligature is applied. The free ends of kshara sootra are placed into the sinus cavity for action of kshara sootra.

After giving Normal saline wash, wound is mopped and the cavity is packed with the gauze soaked with a weak iodine solution and bandage is applied.

Pashchat karma :-

- Antiseptic dressing is done daily in first week.
- Kshara sootra is changed afte 1 week by rail-road technique and tightened. This is done for 4 weeks or till the wound heals.
- Triphala guggulu 2 TDS.

Varti (medicated wick) :-

This consists of Haridra, aragvadh (Cassia fistula), agaru (Aquilariua agalocha) with madhu and ghrita. It does shodhan and ropana of track.

Application of Variti in Acure Pilondial Sinus :-

Acharya Sushruta has advocated the use of varti in case of Bhagandara Chikitsa.

Acharya Chakradatta has also mentioned another type of varti which is prepared by mixing snuhi latex, kshara and haridra powder. The varti in inserted inside the bhagnader gati (tract). It may act by cauterizing the fistulous tissue an draining the track.

The description of use of varti in nadi (sinus) is well documented in Bhaishajya Ratanavali.

Poorva Karma :-

- Preparation of the part by shaving and painting with antibiotic solution.
- Tetanus prophylaxis is given.
- Xylocaine sensitiveity is done.
- Enema is given to clear the bowel.

Premedication :-

Injection Promethazine hcl is given half an hour before the procedure to calm down the patient i.e. sedation without depressin.

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Step 3 Curettage :- Unhealthy granulation tissue along with the impacted hairs is curetted well with a Volkmann's spoon.

Step 4 Trimming of the edges :- Trimming of the edges of the wound is done to promote proper drainage and subsequent healing.

Step 4 Placeing the varti :- The NS wash is given and the varti application is done through the sinus tract deep into the natel cleft for chemical debridement and cauterization. The "T" bandage is applied.

Pashchat Karma :-

- Antiseptic dressing is done daily.
- Triphala guggulu 2 TDS
- The varit is changed afer 1 week. This is done till the wound heals completely.
- Antibiotics after culture and sensitivity test.

Sclerotherapy :-

The method of treating pilonidal sinuses is by injection phenol to destroy the epithelium of track and sterilize the cavity in hope that after extrusion of the hairs the sinus would heal. A short general anaesthesia is required.

Patient has to be in prone jack knife position with the sacrum horizontal. The skin has previously been shaved, with particular attention to the natal cleft. It is now cleansed with spirtit.

An area of skin approximeately 15 cm in radius around the sinus is generously smeared with petroleum jelly to protect it from inadvertent overflow of phenol.

The main sinus and its side tracks are gently probed, particular care being taken that no new tissue planes are opened up and a blunt nosed coned needles (such as is employed for injecting into ureteric catheter in retrograde pyelography) is inserted firmly into the orifice of main track, its shape securing for it a very sung fit. Pure phenol is then injected slowely without presuer untill the fluid is seen to ooze from all the side openings, Excess is immediately wiped away form the surrounding skin. The phenol is left in sinus for about a minute, the needle is then withdrawn and the tissue together with loose hairs and debris is expelled by pressure over the track.This injection expression sequence in repeatd until the total period of contact of the tissue with phenol is approximately 3 mintes after which the fluid is finally expressed. The orifice of the sinus is usually blenched by the phenol but if this has not occured the area of skin surrounding the opening is touched with phenol to destroy the epithelium. A light dresing of petroleum jelly gauze is then applied and covered with some dry gauze and wool. The patient requries to be in hospital for only 24-36 hours after this treatment and can resume work almost immediately. The area discharges a little serous fluids for a few days or so before eventual healing occurs which takes three to six weeks.

4. Surgical procedures :-

The treament of pilonidal sinus is the excision of all the sinuses with ramifications in quiescent stage since these sinuses may have remifications which may be left behind. It is a good practice to push the methylene blue through the sinuses. In case any ramification of sinus is cut through it will be obvious by staninging of the tissue. An elliptial incision is made to include all openings. The incision si deepende upto the fascia covering the sacrum and coccyx. If any of the reamification has been cut, wider incision should be adivsed to include whole of the ramifications within the excised mass.

If there is any lateral sinus opening. after excision of the mass a sinus forceps is pushed down the lateral track and widened. Now this sinus has to be curetted and no hair shoud be left behind. 1 or 2 cm ofsnius from external opening should be excised. If the pilonidal sinus was not infected. one can attempt primarysuture of wound. A big bite should be taken from both the margins and needle should pass through the fascia covering the floor of wound. The end of sutures are tied over a role of gauze for continual pressure on wound.

The problem with primary suture is recurrence. It is for this reason that the surgeons prefer to leave the wound wide open packed with gauze impregnated with petroleum jelly. The pack is removed after 5 days. Daily cleaning of and irrigation of wound should be done with path to be followed by dressing and after each dressing T-bandage is applied. Healing is expected in 3-4 weeks.

Pilonidal abscess :-

This should be drained by excising an ellipse where the pits of sinuses might be. These pits will bes surrounded by oedema and reduness, after the wound has become free form infection by repated cleansing, adminstration of systemic antibiotics and dressing, one shoule attempt proper excision of sinus and its ramifications.

Other operations :-

1. **Marsupialization :-** In this technique the sinus track is excised, may not be to the whole extent upto th sacrococcygeal fascia. The edges of skin are now sutured to the margin of ramenant membrane which forms the deep part of sinues. Haemostasis is maintained and pressure bandage is applied.

2. **Bascom technique :-** This procedure involves and incison lateral to the midline which allows the chronic abscess cavity to be scrubbed off for hair and granulation tissue. Removal of small midline pits is careied out with small 7 mm incisions.

The lateral wound/abscess is left open but the midline incision are closed.

3. **Rhomboid Flap :-**

The patient is operated under general anesthesia, the patient is placed in a jack knife position, the natal cleft together with the two buttock areas are shaved and disinfected with povidone iodine solution, methylene blue is injected through the sinus opening or openings to mark all barnches of the sinus. Wide rhomboid excision of the sinus bearing area, so that all sinus tracts are excised en block. Excision is carried out deep to the presacral fascia medially and to the gluteal muscels lateraly, then a modified Limberg flap is prepared form either gluteal regions. The flap included the skin, subcutaneous tissue, and fascia of the gulteal muscle. Careful haemostasis using both electoro cauterization and surface cauterization using the arteal muscle of the donor side. Lateral suction drain is used in all cases, and subcutaneous tissue is approximated with polyglactin sutures in two layers.

The skin is closed using either polypropylene sutures or skin staplers. The drains are removed after draninage decrease under 15-20 ml/day, in an average period of 6 days (4-10 days). Half of the sutures or skinstaples are removed on the twelfth postoperative day, the second half on the fourteenth posoperative day. All patients are followed up for a period ranging from 6 months to 3 years, the mean follow uptime is 26 months.

4. **Karydakis procedure :-**

The karydakis procedure is one of the asymmetric flap techniques used in the treatment of sacrococcygeal pilonidal sinus disease. The procedure has been used in 1973 and karydakis has reported the largest patients number, longest follow up period, and lowest recurrence rate of (<1percent) using this technique. The procedure consists of an asymmetrical elliptical excision, mobilization of the flap from the median side of the wound, fixation of the base of the flap to the sacrococcygeal fascia and sutruring of its edges to the lateral one. A modification of the original karydakis technique has been applied at an Egyptian university hospital.

5. **Complete excision of the sinus :-**

The actual incision is very simple performed, the difficulty arises in connection with the disposal of large wound. Excision is best carried out when the lesion is in quiescent phase. If there is an actual abscess present with the signs of actue inflammation in the surrounding tissue, the correct procedure is to drain the absces by a small incision. The actual excision can then be undertaken more satisfactorily two or there weeks later when the inflammation has subsided.

Excision is more conveniently carried out under a general anaesthesia. Some surgeons place the patient in prone position with the sacrococcygeal region elevated by pillows or angulations of the table. But lateral position is pre-ferred with the buttocks projecting slightly beyond the edge of the table. The skin is prepared by painting with iodine or some other skin antiseptic to minimize the risk of contamination from this source during the operation. Toweling is then applied, care being taken to clip the macintosh and towel covering the anal region and perinueum to the skin immediately behind the anus as a furgher precaution against sepsis. Good lighting is done by mobile light source. The assistant stands on the opposite side of table and by firm traction with the fingers of both hands elevate the uppermost buttock thus rendering the internal skin tense and more suitable for excision. As an immediate preliminar to operation, some surgeions inject mehtylene blue or other dye into sinus in order to stain all parts of track so that if it is inadvertently cut across any point they will be made immediateely under this fact. This technique may perhaps allow this excision to be carried out closure to the lesion and in more selective manner.

The incision is an elliptical one to includes all sinus openings. If a secondary sinus lies unusually in lateral position the incision is extended to incorporate it, either as a special offshoot or as an enlargement of the whole ellipse. The incision is deepend at right angles to the skin through healthy fat to reach the fascia covering the coccyx and sacrum while traction is then applied to the isolate ellipse of skin and fat, it is separated from the fascia by scalpel or scissor dissection commencing at the anal end and procedding cranialwards. In the process, numerous bleeding points are encountered close ot the bone and are most easily dealth with the diathermy coagulation. True pilonidal sinus lies superficial to the coccyx and sacrum so it is never necessary to remove any part of bone in order to excise them. Thus resulting wound is of considerable size and has steep shelving edges. It may be dealt with in several ways.

Primary suture :-

After careful homeostasis with diathermy and hot pack a close series of deep sutures of strong braided silk or braided nylon is inserted on the large half circle or 5/8 Hagedown neddles. These are passed at interval of 2.5 cm form one another and 2 cm from skin edge. Each stitich emerges in wound at the junction of fat with fascia on the back of coccyx and sacrum. It then takes a bite of this fascia roughly in the middle and passed in reverse direction from that to skin through the opposite side wall.

The ends of deep sutures are clipped with forceps and left untied while the actual skin edges and immediate subcutaneous fatare united by close series of vertical mattress suture of No. 4 serum proof silk, tie as they are inserted. When the skin wound has been closed , a thick roll of gauze is applied and the deeps sutures are tied firmly over it thus approximating the sides of the wounds, not only to one another but also to the back of sacrum and coccyx. Further gauze and cotton wool are then placed over the anchored dressing and kept in position by several transverese strips of broad elastic, straping extending from one buttock to the other. Care is taken to see that the strips nearest to the anus make contact with the post anal skin in midline and to help to seal off wound and dressing at this dangerous end. Finaly T bandage is applied to reinforce the pressure of the strapping.

6. **Closure by plastic procedures :-**

By Lahey and Cattell of Boston :- Relaxing tension on the sutures in the main elliptical wound by making a stratight or angled relieveing incision in the skin and fat on buttock. The sceondary wound is then closed by an advancement types of suture.

Dour's and starts of Sydney :- This consists of a rotational flap of skin and subcutaneous tissue form the buttock into the defect, care being taken to make the width of base of flap at least half the length of its free edge. The secondary defect in the buttock can usually be closed by simple suture or a further small plasic procedure.

Pope and Hudsono :- They described a more complex method of closing pilondial sinus wound by mobilization of gluteus maximun muscle to from sliding muscle grafts.

Z-plasty/ Eccenteric :- Elliptical excision with subsequent undercutting of the medial margins of the wound and its advancement across the midline have also been described.

The multiplicity of the techniques however strongly suggests that these operations are neither simple to perform nor by and means invariable successful in their results.

Leaving wound open to granulate :- Wound is simple packed open with gauze soaked in soft paraffin gauze or other dressing. The subsequent management is as for an ordinary fistula with opening bowels on the third day and thereafter patient shole be advised to take morning an evening sitz bath followed by wound irrigation and dressing. The usual pilonidal wound treated by this mehtod takes upto 8-10 weeks to heal completely and hospitalization is usually necessary for the first four weeks of this time.

Thiersch grafting of the open wound :- The may be performed as a primary procedure or carried out secondarily once granulation have filled the wound cavity. In primary grafting the 1st sheets of skin are sutured in position.

The grafts are taken from medial aspect of thigh and applied as a sheet to the raw surface, having been sutured to one another and to the skin edges to provide complete covering. They might have needed to be nicked with scissors in place to facilitate the escape of serous fluid and present their being float off. The results of primary graft are not good because it produces deep skin covered depression in the sacrococcygeal region. To overcome this objection the application of the grafts may be postponed till the wound has filled with granulations i.e. after 3-4 weeks. Unfortunately grafts take much less readily on granulation tissue then of fresh raw surfaces and the percentage of successful results or even partial thickness is very much lower than with primary grafting.

A practical difficulty with grafting at this stage is that by then the patient is mobile, is on normal diet and has become accustomed to the routine for a daily motion and twice daily bath and dressing patient is therefor rather unwiling to accept strict bed rest, a reduced diet and the discomforts of constipation for five to six days in order that grafting may be carried out and his displeasure is much augmented if after all grafts fail to take.

शोफं न पक्वमिति पक्वमूपेक्षते यो यो व्रणं प्रचुरपूयमसाधुवृत्तः।
अभ्यन्तरं प्रविशति प्रविदार्य तस्य स्थानानि पूर्वविहितानि ततः स पूयः।
तस्यातिमात्रगमनाद् गतिरित्यतश्च नाडीव यद्वहति तेन मता तु नाड़ी।।

(सु. नि. 10/9/ विसर्पनाडीस्तनरोग निदान)

शल्यजन्य नाडीव्रण :-

नष्टं कथञ्चिदनुमार्गमुदीहितेषु स्थानेषु शल्यमचिरेण गतिं करोति।
सा फेनिलं मथितमच्छमसृग्विमिश्रमुष्णं स्रवेत सहसा सरूजा च नित्यम्।।

(सु. नि. 10/14 विसर्प निाडी स्तनरोगनिदान)

फेनपूयानिलवहः शल्यवानूर्धनिर्वमी। भगन्दरोऽन्तरर्वहनस्तया कटयस्थिसंश्रितः।। (अ. हृ.)

लक्षण नाडीव्रण :-

तत्रानिलात्परूश सूक्ष्ममुखी सशूला फेनानुविद्धमधिकं स्रवति क्षपायाम्।
तृट्तापतोदसदनज्वरभेदहेतुः पीतं स्रवत्यधिकमुष्णवहः सु पित्तात्।।
ज्ञेया कफद्वहुधनार्जुनपिच्छिलास्त्रा रात्रिस्त्रुतिः स्तमितरूक्कटिना सकण्डुः।
दोषद्वयाभिहितलक्षणदर्शनेन।। तिस्त्रो गतीर्व्यतिकरप्रभवास्तु विद्यात्।। (सु. नि. 10/11-12)
कटुत्रिकं वचा हिंगुलवणान्यथ दीणकम्। पाययेच्चाम्लकौलत्थ सुरासौवीरकादिभिः।। (सु. चि. 8/38)
ज्योतिश्मती लांगलकी श्यामादन्तीत्रिवृतिलाः। कुष्ठं शताह्वा गोलोमी तिल्वको गिरिकर्णिका।।
कासीसं काञ्चवक्षीर्यौ वर्गः शोधन इष्यते।। (सु. चि. 8/39)

क्षारसूत्र :-

एषण्या गमिन्विश्य क्षासूत्रानुसारिणीम्। सूचीं निदध्यान्दत्यन्ते तथौन्नम्याषु निर्हरेत।
सूत्रस्यान्तं समानीय गाढं बन्धं समाचरेत्। ततः क्षारबलं वीक्ष्य सूत्रमन्यत् प्रवेशयेत्।
क्षारात्तं मतिमान् वैद्यो यावन्नच्छिद्यते गतः। भगन्दरेऽप्येष विधिः कार्यो वैद्येन जानता।। (सु. चि. 17/30-32)
या द्विव्रणीयेऽभिहितास्तु वर्त्यस्ताः सर्वनाडीषु भिशग्विदध्यात्।
घोण्टाफलत्वग्लवणानि लाक्षापूगीफलं चालवणं च पत्रम्।
स्नुह्यर्कदुग्धेर्कदुग्धेन तु कल्क एष वर्त्तीकृतो हन्त्यचिरेण नाड़ी।। (सु. चि. 17/34-35)

आरग्वधनिशाकालाचूर्णं मधुघृताप्लुतम्। अग्रवर्तिप्रणिहितं व्रणानां शोधनंहितम्।
योगोऽयं नाण्यप्याशु गतिमेघविमानिलः।। (सु. चि. 8/30)

स्नुह्यर्क दुग्ध दार्वीभिवर्ति कृत्त्वा विचक्षणः। भगन्दरगति शात्वा पुरयित्वा प्रयत्नतः।
एषां सर्वशरीरस्थं नाडीं हन्यान्न संशयः।। (चक्रदत्त 44/6)

जात्यर्कशम्याककरंजदन्तीसिन्धूत्थसौवर्चलयावशूकैः वर्त्तिः कृताहन्त्यचिरेणनाडी स्नुक्क्षीरपिष्टासह चित्रकेण।।
(भै. र. 50/11)

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Chapter - 16
Application of Kshara Sootra in Different Clinical Variants of Fistula in Ano

Application of kshara sootra in multiple fistulae :-

The multiple fistulae are of two type

1. Those having multiple extenal openings but only one internal opening.
2. Multiple external opening with separate interal opening for each fistula.

In both cases, separte threads have to be applied for each tract.

In some cases multiple fistulae are just superficially connected without a deeper tract and internal opening, these fistulae may be threaded skin to skin.

Sometimes there are two or more external opening of one tract is situated in the same line at the same clock position, in such cases kshara sootra should be applied through distal most opening only and remaining openings will be taken care of by the same thread as it gradually advances by cutting through the tissue.

In other type of multiple fistulae, which have multiple external openings, multiple tracts and multiple internal openings, kshara, sootra is applied considering each as a separate fistula. The kshara sootra may be applied simultaneoulsy or one after another. But no two thread should pass through the sphincter at the same period, otherwise fibres of sphnicter will contract which ultimately lead to incontinence.

Application in high Rectal fistula :- It is a misnomer and represent exceptionally high anal fistula and the pelvi-rectal fistula. In both these cases primary source of infection is present on dentate line. In case of pelvi-rectal fistula, the tract often pierces through levator ani muscle and the cavity lies in the supra-levator or the pelvi-rectal space. Presence of a thread at the level of anorectal jucnction would effectively drain and debride the supra-levator cavity and thereby induce healing process.

If the supra-lavator tract opens into ampulla of recum above anorectal ring, normaly primary sourceof infection is at ano-rectal ring but if the infection has traversed from the rectum above this line,it suggest some patholgy in colo-rectal canal as ulcerative-colitis. Fistula heals spontaneously as the disease treated or kshara sootra application is done. But in no case rectal wall will be pierced otherwise faecal fistula will be formed.

Application in Blind Internal Fistula :- As kshara soota application requires both internal and external opening but in these type of cases there is lack of extenal oepning. So pre-erquisite is to locate external opening either by assessing a moderate swelling present over peri-anal area or by retrograde probing. Then convert this incomplete fistula into complete fistula by communicating both these opening and then ligate the kshara sootra as usual.

Blind external fistula :- When external tract is not located well due to development of granulation tissue in the way of internal tract. This type of fistula is treated first by kshara varti followed by kshara sootra karma.

- Kshara varti is a small thin wicks of mixture of latex of E. nerrifolia linn., kshar of acyranthus aspera and powder of curcuma longa.

- Kshara varti is introcuced into the extrernal opening for 3 to 4 days. It helps in the debridement of all necrotic tissues and draining the tract. After draining the tract, kshar sootra is passed through the tract.

Advantages of Kshar varti :- It effectively debrides all the necrotic tissues and unhealthy granulation tissues. Thus enhancing drainage of the primary tract of fistula in ano. Due to the patency of the primary tract with the use of kshar varti, the secondary ramifications are liable to complete and effective drainage.

Application in Recurrent fistula :- In thses cases cause of recurrence should be identified by investigations. If no specific lesion is found then only application of kshara sootra is indicated.

Main probelm which is to come across in managing these patient that they had operated previously for one or more time, due to which entire soft cushion of fat is changed into hard fibrous tissue and that makes application of kshara sootra and initiation of healing process difficult. But here cutting should keep pace with the healing.

Application of Tubercular fistulae :- Tuberculosis is a known cause for fistula and is of two type :-

1. **Primary-** In this fistulae descend directly from a tubercular nidus in some structure in pelvic cavity. Kshara sootra is of no use unless primary focus is treated or destroyed.
2. **Secondary -** These fistulae are secondary to a distant tubercular focus in body. If a ture distant focus in located a full course of ATT with application of kshara sootra but if no distant focus is located local instillation of streptomycin at every dressing may serve the problem.

Application in Diabetics :- Diabetes retards the healing process by providing less nourishment to the tissue and it allow the infective organism to flourish.

So blood sugar shouled be well under control before starting and during kshara sootra treatment.

Application in hypertensives :- High blood presseure has no deleterious effect on wound healing. Anti hypertensives, analgesic and anxiolytic should be used along with the regular treatment of kshara sootra.

Application in Cardiac patients :- Anaesthesia and surgery are normally contraindicated in cases of cardio- pathology. But if necessary analgesic and anxiolytic should be given half an hour befor kshara sootra karma and the procedure shoule be in presence of cardiologist.

Fistula associated with piles :- If a patinet have internal or external pile mass associated with fistula, the pile masses should be excised before kshara soorta application in fistula.

Fistula associated with fissure abscess :- If abscess can be palpated form external surface, then abscess should be incised and kshara sootra should be applied in tract. It drains abscess cavity both inside the anal region and externally in the skin. In case sentinal tag with fissure is present with fistula, the tag should be treated before the application of kshara sootra for fistula.

Horse-shoe shaped fistula :- It is type of multiple fistula involving both ischio-rectla fossa. It usually have internal opening at 6 or 12 o clock position. In this type of fistulae separate thread for separate fistula are ligated with same internal openings.

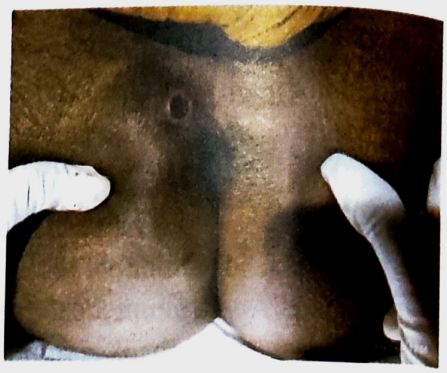
After debridement kshara sootra is applied easily as described earlier.

Anal fistula with chronic cavity :- If chronic sinus with abscess in present inside the anus and is observed form external surface during palpation, one should incise and pass a maliable probe in the tract and kshara sootra is applied. It drains the abscess cavity inside the anorectal region and externally in the skin.

Application in neurogenic patient :- In the paraplegic and hemiplegic patient management of fistula in ano by kshara sootra is non problomatic as they have no sensation of pain nor the external sphincter remains hypertionic or contractile any more.

Management of the wound is also very troublesiome is these patient because of there dependency on others.

Anal fistula with abscess and large cavity :- In this absecss is incisied and drained at the earliest. If fistulous tract contains a large cavity the kshara pichu is put inside the cavity. Insertion of pichu in cavity helps in proper drainage and debridement of unhealthy granulation or necrotic tissue.



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Chapter - 17

Complications Encountered during Ano-Rectal Surgical Practice & Management

During Examination :-

1. Pain associated with Examination.
2. Neurogenic Shock.
3. Manipulation induced Trauma, haemorrhage & Mucosal tears.
4. Reason: improper approach to examination.

Prevention :-

- Proper History taking & explanation to the patient about the method of examination.
- Gentle Approach for examination while proceeding for DRE & Proctoscopy
- Appropriate usage of Lubricants/topically acting LA.

During Procedure :-

Drug related :-

Reason :- Owing to the Sensitivity.

Prevention :-

- Thorough History taking concerning Any sensitivity & ADR observed.
- Sensitivity Test

Anaesthesia related :-

Reason :-

- Sensitivity for local Anaesthetic Agent.
- Inappropriate selection of the drug.
- Inappropriate Dosage calculations.

Prevention :-

- Sensitivity for local Anaesthetic Agent.
- Appropriate selection of the drug.
- Appropriate Dosage calculations.

Procedure related Complications :-

Reason: iatrogenic origin :-

Prevention :-

- Proper planning
- Planned Execution

Haemorrhage & Un-intentional Injuries :-

Reason :- Iatrogenic origin.

- Appropriate identification of the bleeder
- Cauterisation or Ligation of the bleeder
- Pressure and packing
- Repair of the tear

After Intervention :-

Reactionary haemorrhage :-

Reason :- Restlessness due to in-appropriate pain management.

- Appropriate Pain Control.
- Appropriate care for restlessness.
- Appropriate identification of the bleeder
- Pressure and packing
- Cauterisation or Ligation of the bleeder
- Repair of the tear

Urinary retention :-

Reason :- Owing to sphincteric Spasm (Urinary Bladder) due to anal dilatation or dissection in perineum.

Management :-

- Proper pain management in post procedure period.
- Antispasmodic measures like Fomentation in Hypogastric region.
- Anti-spasmodic like Hyoscine butyl Bromide as I/M
- P/U catheterisation must be a last approach that too taking necessary precautions.

Constipation :-

Reason :- Owing to sphincteric Spasm (anal sphincter) due to anal dilatation or dissection in perineum

Management :-

- Proper pain management in post procedure period.
- Proper diet plan
- Bulk forming Stool softeners

Late Complications :-

Secondary Haemorrhage :-

Reason : Owing to sloughing secondary to the infection in Post operative period.

- Appropriate Infection
- Appropriate care for restlessness.
- Appropriate identification of the bleeder
- Pressure and packing
- Cauterisation or Ligation of the bleeder
- Repair of the tear

Incontinence to flatus/Faecal matter :-

Reason : Sphincteric damage.

- Requires follow up for review and needful.
- May require surgical intervention.

Stricture formations & Anal canal Stenosis :-

- Excessive mucosal resection
- Post procedure infection & Sloughing
- Excessive fibrosis

Prevention & management :-

- Minimal resection of the mucosa.
- Appropriate infection control in post procedure period.
- Appropriate usage of Anal Dilators in Post procedure period.

Pelvic floor weakness :-

Reason :- Unintentional Iatrogenic Damage to pelvic floor.

Prevention & management :-

- Proper planning
- Planned Execution
- Kegel exercises

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Notes

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About the Book

This handbook provides comprehensive knowledge of the applied anatomy of the anal canal, along with the aetiology, clinical features, diagnostic methods, and management principles of commonly encountered conditions such as fissure in ano, anal canal abscesses, fistula in ano, and rectal prolapse. It uniquely integrates Ayurvedic approaches—including Kshara-Karma and Kshar-Sutra treatment—with contemporary medical and surgical practices, offering a holistic perspective. Designed for students, researchers, and clinicians, the book bridges traditional Ayurvedic wisdom with evidence-based modern proctology.

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(Oriental Publishers & Booksellers)
झालानियों का रास्ता, किशनपोल बाजार, जयपुर– 302001
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ISBN - 978-93-92133-50-3
9 789392 133503